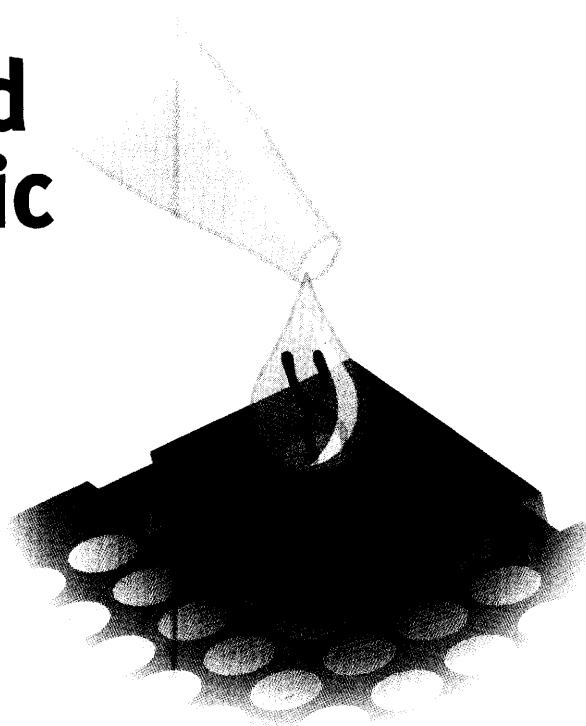


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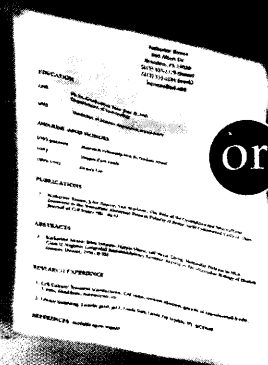
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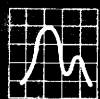
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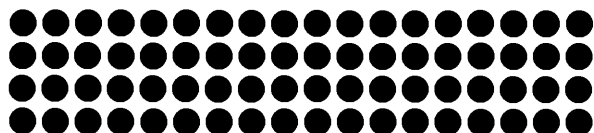
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THE SKY IS THE LIMIT

The enormous number of stars in the visible universe and amount of data from decades of analyzing the heavens offer formidable challenges to astronomy program designers. The Digital Universe is a recent attempt to put this information together in a meaningful

way. Aimed more at sophisticated amateur and professional astronomers than at novice backyard hobbyists, the program claims to provide information on over 20,000,000 celestial objects. Thanks to a very clever design, the program and accompanying data fit on a single CD-ROM disk. How is this possible? Much of the data is in the form of Web-based links.

The Digital Universe can generate views of the night sky over an amazing time span (any date from 100,000 B.C. to 100,000 A.D.) and can provide sky views from locations other than Earth. The most impressive aspect of the program is the efficient way in which information is organized. Users can learn about an object by either clicking on it in a sky projection or by numerous search options (e.g., solar system, stars, etc.). Searching for a star, for example, brings up a page with the name of the star, links to images of the star, links to other information about the star on the Web, technical positional and nomenclature information, spectra, and more. Pulling up such information on a planet, such as Mercury, produces over 20 pages of hyperlinks, as well as dozens of pictures. Just organizing the information must have taken several person-years of effort.

Despite containing much highly technical information, the program has numerous features that will be of interest to beginners as well. Most of the technical terms are hyperlinked to definitions. A section covering the history of astronomy is very well done and informative. Biographical profiles of over 100 astronauts and astronomers are also available. As this review was being prepared, the company announced beta tests of a new version of the program that can control the positioning of computerized telescopes.

The program is not without quirks. Using the search functions to find an object does not automatically bring up the information window about an object. Instead, users must also click on the object on the screen. Second, clicking on an object "below the horizon" does not always result in appearance of the information window. Information on asteroids was not as easily accessed or nearly as extensive as information on planets and moons.

That said, for the money there is no other astronomy program with as much useful information as this one.

—Kevin Ahern

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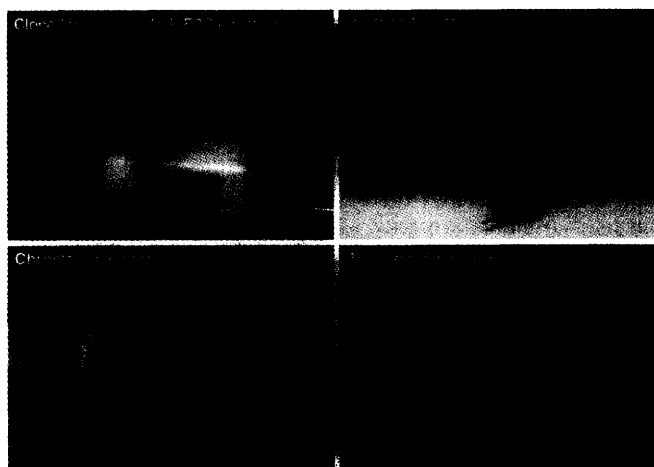
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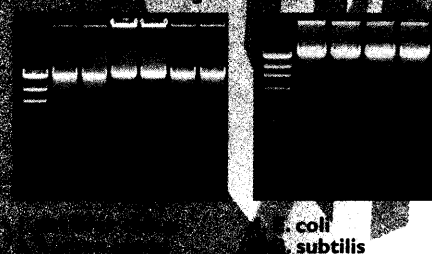
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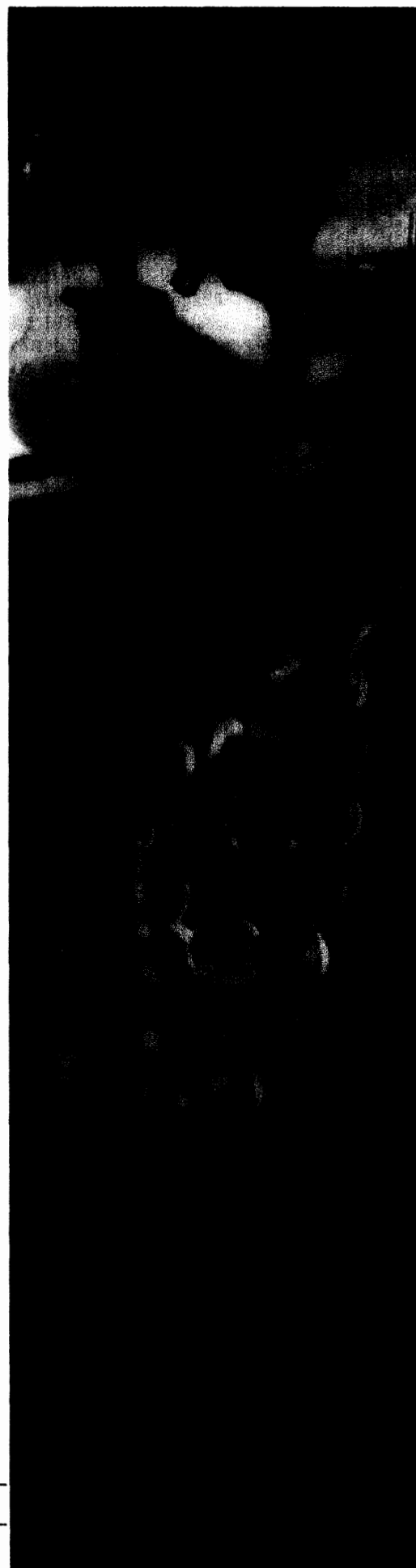
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Scientists who wish to use DNA chips or microarrays to pursue their investigations have a growing variety of choices. Vendors offer off-the-shelf and customized versions as well as support for do-it-yourself chips.

BY PETER GWYNNE
AND GARY HEEBNER



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A few life scientists may mourn the passing of the days when the concept of "one gene, one experiment" controlled their professional lives. But most of their colleagues have welcomed the arrival of the DNA chips and microarrays that offer researchers the opportunity to run thousands of samples simultaneously in a single experiment under virtually identical conditions. The pharmaceutical industry in particular values the use of microarray technology to screen increasing numbers of molecules in smaller volumes as drug candidates. "There's tremendous excitement about the technology," says Alex Szabo, vice president of **Stratagene**. "Everyone realizes that it's one of the key technologies in the genomic era."

Microarray technology seems tailor-made for the type of exploration necessary to follow up the initial work on sequencing the genes of humans and other organisms. "Genome projects give you, in a sense, a list of the words in the genomes' vocabulary," says Patrick Brown, professor of biochemistry at **Stanford University** and a pioneer in developing microarrays for research use. "If you want to learn what words mean in a foreign language you look at how they are used. It's the same for genes. Microarrays as a way of seeing how genes express themselves will be the most widely used application of

arrays." Jeff Mooney, business technology manager of **Corning Microarray Technologies**, extends that thought. "The more we look at the human genome, the more questions people have. Microarray platforms help to answer general and specific questions."

Beyond that, researchers see use of microarrays in such areas as genotyping, studying disease pathways, analyzing single nucleotide polymorphisms (SNPs), and examining proteins. "Expression arrays offer researchers the promise of finding the fundamental causes of disease and identifying new, more precise strategies to diagnose, treat, prevent, and ultimately cure disease," says Stephen Fodor, chairman and CEO of **Affymetrix, Inc.**, the first major manufacturer of arrays.

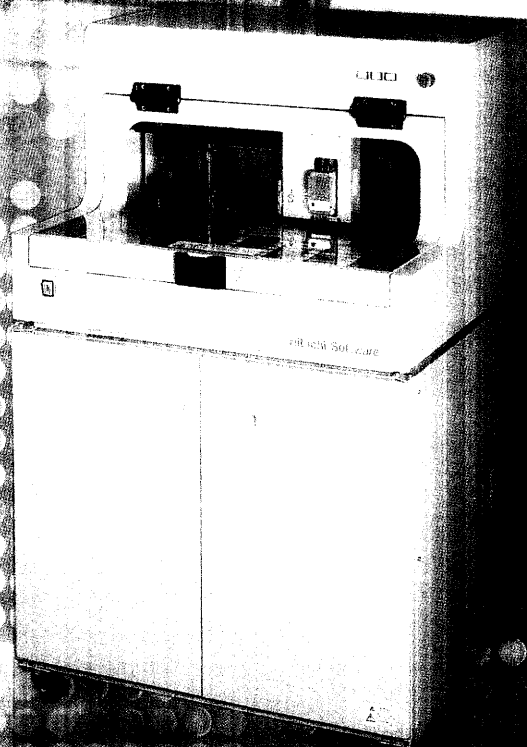
Plenty of vendors have joined Affymetrix in the microarray marketplace. "There are tens, if not hundreds, of companies out there trying to find the next technology," says Andrew Farquharson, executive vice president of **Operon Technologies, Inc.** Some newcomers, such as **NimbleGen Systems, Inc.**, aim to follow the model pioneered by Affymetrix and **Incye Genomics**, producing microarrays for core facilities in large industrial and academic departments. Others, such as Corning, plan to enter the market with "theme arrays" targeted at

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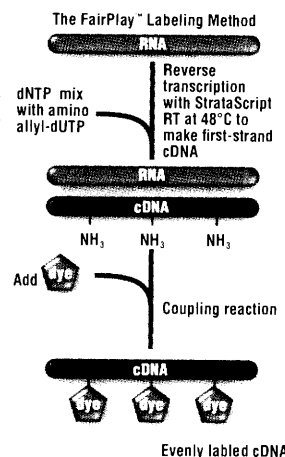
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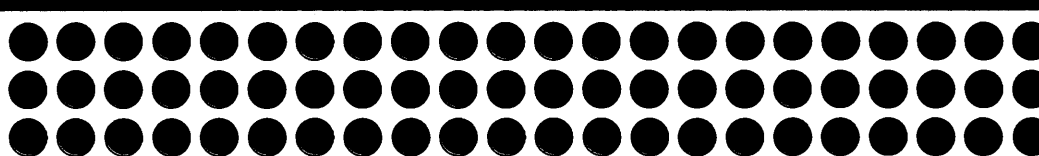
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DNA microarrays are microscopic groups of thousands of DNA molecules of known sequences attached to a solid surface...

specific diseases. Yet more, including **Agilent Technologies** and German company **Graffinity Pharmaceutical Design, GmbH**, provide specific services such as printing and finger-printing arrays designed and used by individual researchers. And several vendors, among them **CLONTECH Laboratories**, a subsidiary of BD Bioscience, and British firm **BioRobotics, Ltd.**, provide the basic tools necessary for individual researchers to carry out the entire process of producing microarrays, including printing.

Types of Microarray

The concept emerged 10 years ago. "Light-directed, spatially addressable parallel chemical synthesis," a paper by Fodor and colleagues in *Science* (251:767-773, 1991), opened the way for the entire microarray industry. DNA microarrays are microscopic groups of thousands of DNA molecules of known sequences attached to a solid surface such as a nylon membrane or a simple glass microscope slide. Each array consists of an orderly organization of samples that provides a medium for matching known and unknown samples based on base-pairing rules and automating the process of identifying the unknowns. Microarrays come in several varieties, each of which has specific advantages for research and screening.

Brown's team at Stanford, in collaboration with Mark Schena and Ron Davis, working as consultants to Affymetrix, developed the basic technology for what scientists now regard as the traditional type of microarray. It uses lengths of complementary DNA (or cDNA) produced from cellular messenger RNA using the reverse transcriptase polymerase chain reaction (RT-PCR). Stretches of cDNA about 500 to 5,000 bases long are immobilized onto a substrate and exposed to a set of targets either separately or in a mixture. "We thought that the real application of array technology was being able to look at gene expression programs on a very large scale," recalls Brown. "The technology needed to be user-friendly and cheap."

The other form of microarray consists of oligonucleotides or peptide nucleic acids synthesized either *in situ* on the chip or by conventional synthesis followed by immobilization on the chip. The array is exposed to labeled sample DNA and hybridized in order to determine the identity and abundance of its complementary sequences. Scientists at Affymetrix developed this type of microarray, which is often called a DNA chip. The company notes that its short oligos have strong specificity because they can distinguish single base mismatches. Affymetrix also optimizes hybridization conditions to maximize the sensitivity of oligos of different lengths.

Operon Technologies, Inc. has designed oligonucleotide probes longer than usual. "We've done a number of experiments with oligos of different lengths," says Farquharson. "We've determined that the 70- to 80-base range is optimal for specificity and sensitivity. One of the powers of making oligo arrays is that you can look at your genome and design the arrays to match it."

Arrays can accommodate biomolecules besides DNA. CLONTECH has a unique type of RNA microarray. "We offer over 100 human tissues on the chip," says Paul Siebert, vice president of research. "In cases where we have limited amounts of diseased tissue — in tumor samples, for example — we convert the RNA into cDNA. We also expect to have our first antibody array by the end of this year."

Arrays can also use proteins. **Ciphergen Biosystems**, for example, has produced a commercial protein chip for use in proteomics research. Some pharmaceutical companies are also using microarray formats to screen the activity of various chemical compounds against targets in their drug discovery programs. In addition some researchers have begun to work with cell and tissue arrays. Several companies now offer these as part of their product lines.

These fundamental platforms for microscale experimentation have resulted from the mar-

riage of several technologies. Robotic engineering, pin technology, molecular biology, DNA sequencing, optical and laser technology, and informatics have all contributed to the development of microarrays. Since few companies can develop expertise in all these areas, individual firms must partner with others to create compatible systems. Alternatively researchers intent on preparing their own arrays must assemble components from several vendors.

Off-the-Shelf vs. Do-It-Yourself

Through much of the past 10 years life scientists intending to use microarrays have faced the decision whether to use commercially available versions of the technology or to embark on their own efforts to design, adapt, and apply their own microarrays to a greater or lesser extent. In fact do-it-yourself microarraying predated the commercial variety. It has continued as a key option for life scientists since then.

As more life scientists have begun to demand microarray technology, the do-it-yourself approach has expanded. So has the need for relevant products and services. "We have a tremendous amount of interest from scientists who want to build their own microarrays specific to their own research using our instrumentation," says Michael Kane, vice president, genomics for **Genomic Solutions, Inc.** Vendors have responded to the growing needs. "There seem to be more and more entrants each year," adds Stuart Elmes, technical director of BioRobotics, Ltd. "But the market is beginning to pick out a few companies, including ours, that are achieving a critical mass."

One reason for the popularity of do-it-yourself microarraying is the expense of commercial versions. "Cost is still the barrier for this technology to become more accessible to the bench scientist," says Leming Shi, a senior research scientist at **BASF Corporation** who has created an information website (www.gene-chips.com) about DNA microarrays. "The tool needs to be

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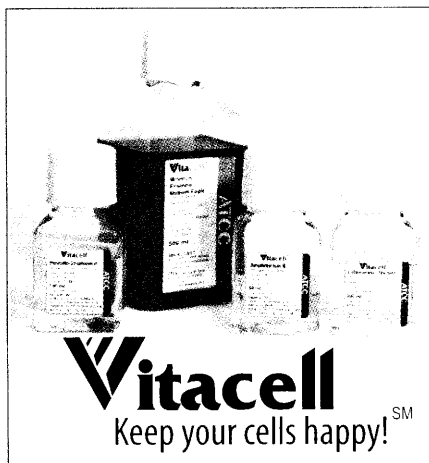
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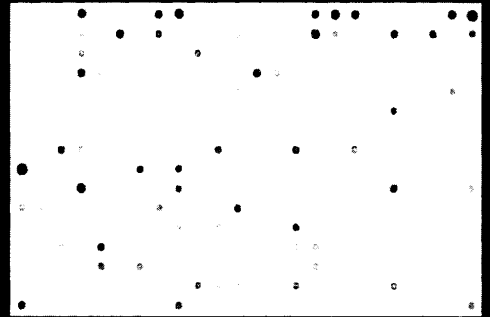
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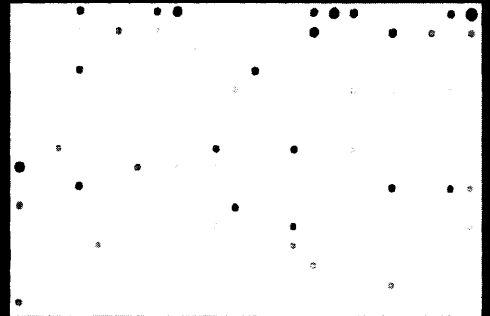
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B



A

Images of Star Profiler Arrays hybridized with DIG-labeled cDNA from human MSTO (A) and NCI-H82 (B) lung cancer cell lines. Following hybridization, array membranes were incubated with anti-DIG AP antibody and then subsequently with a CDP-Star substrate. Membranes were exposed for 5 min to x-ray film.

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as accessible and inexpensive and familiar as, say, a microscope," adds Brown, "because the kind of information you can get from it is useful whatever aspect of biology you're studying. Until the commercial companies can provide the technology at a price that makes it a no-brainer for scientists to use, the do-it-yourself approach will have a role."

Critics also charge that commercial chips are somewhat inflexible in terms of applications. While denying any real lack of choice, commercial microarray-makers have started to expand their offerings. "Over the past year Affymetrix has made major technological improvements to provide customers with more information on a single chip," says Fodor. "These improvements have enabled us to form **Perlegen Sciences**, a genomic subsidiary founded with the objective of scanning 50 human genomes using our GeneChip® technology — a feat impractical through any other methods. In the future, Affymetrix will develop next-generation genotyping arrays developed using the haplotype patterns found by Perlegen." Fodor adds that Affymetrix offers its own do-it-yourself systems via **Genetic MicroSystems**, which it acquired last year.

Other firms have begun to emerge in the microarray manufacturing market. For example, several scientists at the University of Wisconsin,

Over a fairly short period of time researchers have shifted from milliliter to microliter to nanoliter sample volumes.

Madison recently founded NimbleGen to commercialize technology that they had developed in the laboratory. That firm recently announced that it is developing a lower cost DNA microarray system with more flexibility for users. "We look at our role as complementary to Affymetrix's," says Michael Treble, the company's president and CEO. "Our microarrays are cheaper and faster to produce. But our main competition comes from home-grown microarrays."

The Role of Robotics

Laboratory automation has played a major role in allowing scientists to process samples at lower costs. It has done so by using platforms that handle smaller and smaller sample volumes, from microcentrifuge tubes to microwell plates to microarrays. Over a fairly short period of time researchers have shifted from milliliter to microliter to nanoliter sample volumes. Automated workstations and robotics help to reduce the intensive manual labor involved in handling many small samples. Such companies as **Packard Instrument** and **Zymark** have developed expertise in laboratory automation.

Robotics not only handle and process small volume samples in high throughput environments. They are also used to place (or spot) extremely small samples onto the solid supports, such as nylon membranes or glass slides, that make up the substrates for microarrays. "Robotics are of the highest importance for microarrays," says Willem Pleusters, head of surface modifications for German company **Eppendorf AG**. "Otherwise it's impossible to get the quality you need. Regardless of the technology you use, the reproducibility of the array is critical." Sarah Stevens, senior scientist at British firm **Genetix, Ltd.**, agrees. "The robotics for making high-density arrays is actually key," she says. "We have liquid handling capacities on our robots to do tasks such as handling plasma preparations."

This approach makes a stark contrast to experiments based on wet chemistry. That tradi-

tional method involves mixing reagents together in a solution and permitting diffusion to play a key role in determining how molecules interact. Solid phase chemistry enables microarray makers to take advantage of chemical bonding to attach a reagent to the solid support. This allows the reagent to be located in a specific position on a surface, where it becomes easily identified and differentiated from other samples on the same surface.

Arrays of regularly organized samples on a flat surface are ideal for experiments in which a large number of small samples has to be subjected to the same conditions. Each spot in such an array can represent a different chemical experiment and can generate unique data. Several identical array patterns printed on a solid surface provide multiple replicates of each sample. Arrays provide both assay miniaturization and duplication of samples.

Suitable Substrates

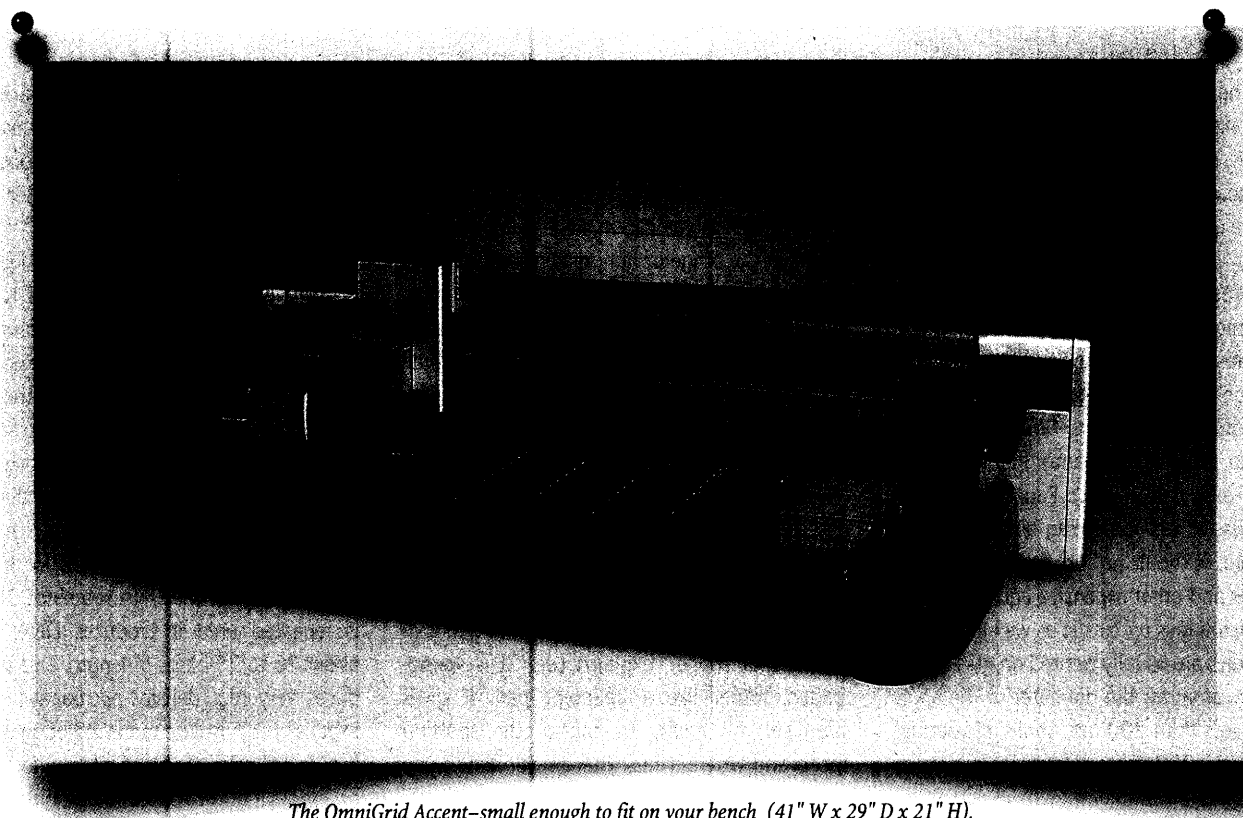
"Microarrays have five different components once you have your samples and your libraries," explains Steve Lee, director of R&D for **MiraiBio Inc.** formerly the genetics division of Hitachi Software Engineering America, Ltd. "They include the chip with its surface, the spotter or the ability to do *in situ* synthesis, a fluidic system to hybridize the chip, a scanner to read it, and — very important — sophisticated programs that allow you to quantify and interpret your results." In the following sections we shall outline basic considerations relevant to these components.

Producing a reliable DNA chip or microarray involves careful control of several critical operations. Significant factors include the density of the array, the method of spotting a sample onto a membrane or slide, and the application that determines the type of material that the spotter places on the substrate.

The density of an array is determined by the size of the spots, the distance between spots (otherwise known as the pitch), and the support

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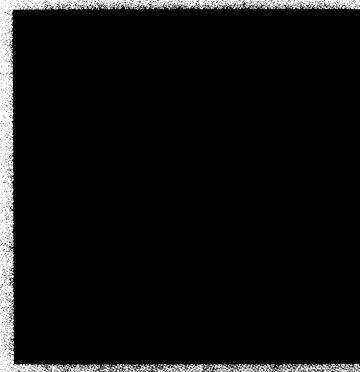
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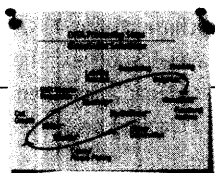
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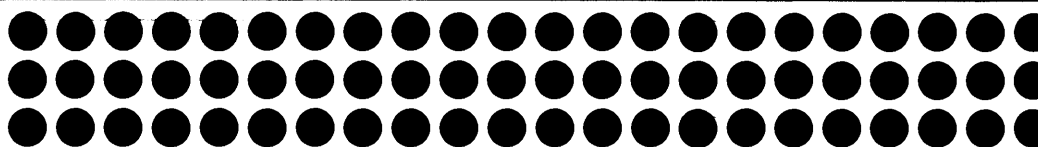
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Adapted from the printer industry, ink-jet technology provides another method of spotting microarrays.

material. The method of printing impacts both the spot size and distance between spots. Macroarrays, offered by CLONTECH, **Geno Technology, Inc.**, and **Sigma-Aldrich**, among other vendors, are usually printed on nylon membranes about 8 cm by 12 cm. in area. They have spots with diameters greater than 300 μm . These arrays can accommodate up to 5,000 spots. This format is ideal for researchers in laboratories that may be operating on a limited budget who do not need high throughput applications. "We were the first company to offer a macroarray in nylon three years ago," says CLONTECH's Paul Siebert. "Our approach was to get something out that people could afford without having to buy confocal microscopes and other expensive equipment. We produce microarrays on plastic as well as glass."

Microarrays are usually printed on glass or silicon. In a microarray, the diameter of the spots is typically less than 200 μm . Some microarrays offer nearly 10,000 spots, while a high-density oligonucleotide microarray may have 40,000 or more spots (or features) per chip. Incyte Genomics, **NEN Life Sciences and Research Genetics**, among other companies, offer these chips. Affymetrix notes that its standard and custom arrays have more than 400,000 different features.

Hitting the Spot

Spotters can use pin, ink-jet, and other technologies to deposit samples onto the support material. Several of the more common methods utilize metal pins, which can be either solid or split. When the pins are dipped into wells that contain the compounds of interest, each picks up a small amount of the material. The pin is then brought into contact with the solid support and a nanoliter volume is dispensed at the desired location. In split pins (otherwise known as quills) a slot cut into the head of the pin functions as a reservoir for the compound being spotted. Quill pins are most often used with glass slides, while solid pins are typically used for spotting membranes.

Amersham Pharmacia Biotech, GeneMachines, and other companies offer spotting robots. "We supply equipment for scientists to print their own arrays," says Elmes of BioRobotics. "Our technology can make large numbers of arrays, in the range of hundreds of thousands or millions. But it is more suitable for medium numbers, from hundreds to thousands or tens of thousands of arrays. It's also more flexible than many on the market. You can make arrays with oligonucleotides, PCR products, proteins, or whatever you want."

MiraiBio, meanwhile, has developed a spotter based on a patent pending proprietary pin design originally intended for the semiconductor industry. "It holds a perfect globe of fluid at the end of the four-pronged tip, resulting in consistent spot shape," explains Lee. "It is spring-loaded, rather like a ballpoint pen. It gives scientists the ability to control the spotting speed and where it hits. Our arrayer allows you several adjustments, x, y, and z, so that the surfaces it spots can be very flexible. It can work on very fragile membrane surfaces, for example."

Genetic MicroSystems, meanwhile, has developed a unique pin and ring technology. Because it is less subject to clogging of quills or pins, this method is more adaptable to different types of array that researchers might wish to make.

Ink-jet technology provides another method of spotting microarrays. Adapted from the printer industry and redesigned for use in biotechnological applications, this uses piezoelectric crystal oscillators and an electrode guidance system to deposit the compound in a precise location on the slide or membrane. Companies such as **Cartesian Technologies** and **ProtoGene Laboratories** use this technology.

ProtoGene's spotter, for example, can deposit individual nucleotides to form oligonucleotides *in situ* (that is, on the chip). Using separate print heads for each base eliminates cross-contamination of nucleotides. In addition this technology produces spots very consistent in size and works

at very high speed. Agilent, taking advantage of its Hewlett-Packard heritage, also uses ink-jets both to deposit presynthesized oligos and PCR products and, using a different writer system, to deposit individual nucleotides to create sequences of interest at predefined locations.

Affymetrix, the market leader in DNA microarrays, uses a proprietary method of photolithography. The company bases its approach on photolithographic masks similar to those used to produce computer chips. The masks control the light-sensitive removal of protective chemical groups from hydroxyls in regions of the slide that are not masked. This allows the altered nucleotides to react with bases in the reaction solution to grow the DNA sequence. The process is repeated until it produces DNA sequences about 20 to 25 bases in length. This system produces very high-density microarrays. It is fairly expensive in absolute terms although competitive in terms of price per bit of information. Changing or modifying the photolithographic mask also takes time and comes at some significant cost.

Affymetrix and Others

Affymetrix led the way in large-scale production of DNA microarrays. "Because we are able to take advantage of semiconductor manufacturing techniques, we're able to make anywhere from 40 to 400 individual GeneChip arrays at one time," explains Fodor. "To meet the rising demand for our products, we substantially increased our manufacturing capacity with the completion and validation of a second manufacturing facility. The manufacturing capacity of this new facility is designed to keep pace with future demand."

Affymetrix offers a broad range of products and services from its standard GeneChip system to custom services for scientists who have budgets that allow them to purchase custom DNA microarrays from a commercial supplier. The company has also helped academic researchers gain access to these chips by creating an acade-

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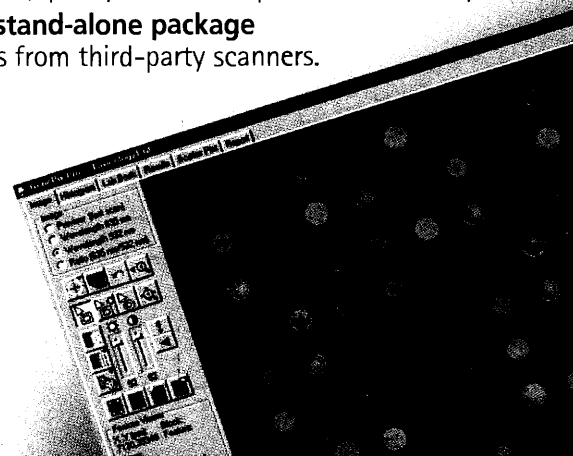
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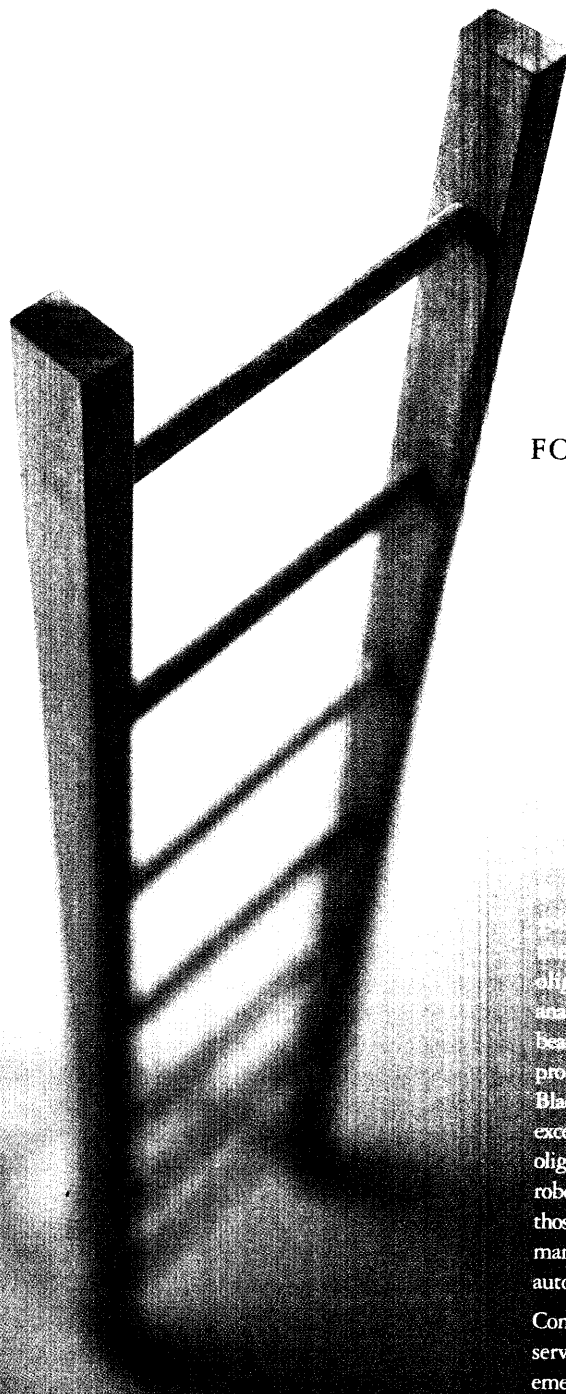
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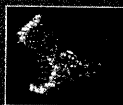
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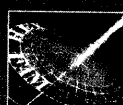
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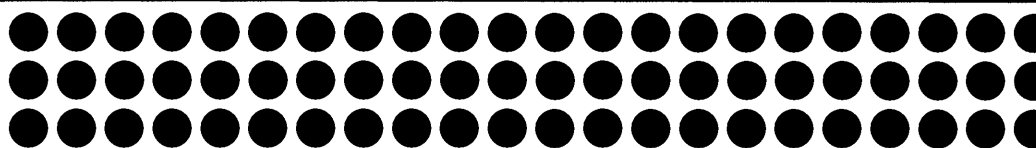
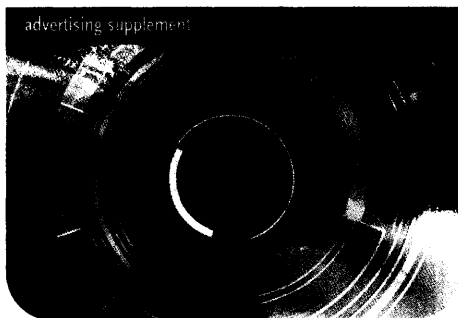
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A scientific team at NimbleGen has developed a new *in situ* arraying method that resembles Affymetrix's photolithographic approach. It differs, however, in that it does not require the use of photolithographic masks. "The primary difference is the way we pattern the light," explains Roland Green, the company's vice president and chief technology officer. This new "maskless" technology uses a system of very tiny mirrors from **Texas Instruments**. It directs ultraviolet light to each desired pixel simply by changing the position of individual mirrors in the system. These mirrors control the path of the light and ultimately determine which pixels will be activated for DNA synthesis. "The process allows us to redesign a chip in a matter of hours," says Green. "Chips are cheaper and faster to produce."

This maskless DNA microarray system has particular interest for life scientists because it can provide them with a great deal of flexibility and customization in producing their microarrays. Rather than make a new photolithographic mask each time the DNA microarray is changed or modified, this system requires the user simply to reprogram the mirrors. That action redirects the light to different pixels on the chip.

San Francisco-based **Mergen Ltd.** introduced what it calls the ExpressChip (TM) microarray system in October 1999. The company makes the chips in human, rat, and mouse multiple formats. The system contains two identical glass microarray slides, key reagents for hybridization and detection and a detailed instruction manual. Each slide is prespotted with DNA sequences functionally important for cell metabolism and/or disease development. "We are the only company that uses spotted oligos," says Qian Jin Hu, Mergen's president and CEO. "We think that this has much more advantage for quality control. We prepurify the oligos, which gives much better quality control than for *in situ* preparation. And the cost and feasibility are better."

Corning has entered the field with what it calls index arrays of 10,000 or more genes. The idea is to create a platform less rigid than those commercially available at present. "Our initial topic is looking at expression profiling for people who want to do target identification," says Jeff Mooney. "At the moment we have a yeast array on the market. Our plans right now are to introduce a human array product during the second quarter of this year."

Spot the Spots

However high its purity and spotting quality, a microarray will lose its value without an effective method of reading its results. "The ability to image what you've got is very important," says MiraiBio's Lee. "The factors to include are the sensitivity of the instrument, its resolution, and the ability to get a proper focal depth. The speed of scanning is also a critical factor for core facilities."

The method of signal detection used with DNA chips depends on the type of label used in an experiment. Common tagging methods include fluorescent, radioactive, and enzymatic approaches. Companies that offer systems of these types include **Axon Instruments**, Genetic MicroSystems, Genomic Solutions, and MiraiBio.

Fluorescent labels are detected with confocal laser scanners specifically designed for use with DNA microarrays. These scanners can eliminate unwanted background fluorescence by limiting the field in which the system picks up signals to those regions above the plane of the array where the substrate is located. This minimizes detection of stray fluorescent signals from the substrate, dust particles, or the slide itself. These scanners often include software for analysis and interpretation of the data.

Radioactive labels can be imaged with a phosphorimager or the much less glamorous but still effective autoradiography film. The most common radiolabels for this procedure are the

phosphorus isotopes ^{32}P and ^{33}P . Both have pluses and minuses. ^{32}P produces a stronger signal and costs less. The more expensive ^{33}P produces a weaker signal but can be used over a greater range. Radiolabels are most often used with nylon membrane macroarrays, such as those offered by CLONTECH.

A third detection method is less commonly used than the other two. Research groups can apply enzymatic detection to nylon membrane macroarrays. Enzymatic systems generally rely on a spectrophotometer to automate the detection process. Alternatively a scientist can inspect the result visually. Both **Display Systems Biotech** and **Genzyme** carry systems for enzymatic detection.

A Matter of Interpretation

Once they complete an experiment with DNA microarrays, scientists need to interpret its readings. Microarrays with thousands of samples or spots can produce huge volumes of data. Storing and analyzing these data can cause a serious bottleneck in laboratory research. In fact, some researchers hope to perform array experiments first with the large comprehensive chips, such as Affymetrix's gene on a chip products, and then down-size their research efforts by focusing on a specific family of genes.

This way of operating stems in part from the complexity of working with large volumes of data. "Most researchers getting into the field are not accustomed to dealing with large data sets, often across large numbers of sample. They may not be in a position to readily derive pertinent results from these large data sets," says Michael Kane of Genomic Solutions. "They may find out only later that their study design and data analysis strategy do not meet their overall research objectives."

Some researchers have partnered with computer programmers to develop in-house software for their individual research efforts. This is not an easy task, however. A programmer who



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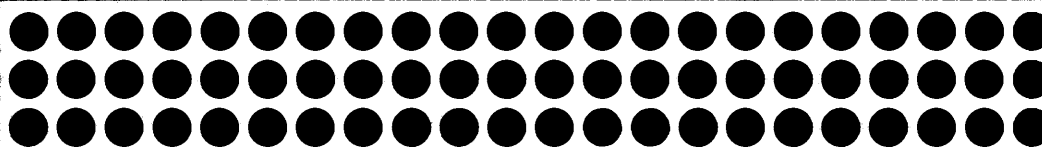
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A programmer who wants to understand the subtlety of interpreting biological data must have a hard-to-acquire familiarity with biology...

wants to understand the subtlety of interpreting biological data must have a hard-to-acquire familiarity with biology and sometimes with clinical diagnostics. Scientists who have a strong background in computer programming increasingly find themselves in high demand as recruits to the new field of bioinformatics.

BASF's Leming Shi exemplifies the qualities needed to interpret microarray experiments. Trained as a molecular modeler, he gained his first real exposure to life science during his post-doctoral research. "I was amazed at how much I was sold on the biology," he recalls. "My interest now is in getting the knowledge out of microarray data for gene discovery, drug discovery, or research. My goal is to integrate bioinformatics and cheminformatics."

Those scientists less than enthusiastic about writing programming code have an alternative. Several suppliers have developed commercial software for analyzing and interpreting data from DNA microarrays. Affymetrix, **Lion Bioscience**, **Spotfire**, and **Silicon Genetics**, among others, offer software packages for this purpose. However, Shi warns against the danger of too much mixing and matching. "The field is still not in a very mature stage even in representing molecular data," he says. "Manufacturers have different standards and a lot of companies have different platforms. What is available from the market cannot always do what the individual department or group needs." The implication: "Each group will have to develop its own software for some years to come," Shi says.

Stress on Standards

The informatics area is not the only segment of microarraying that stands to benefit from standardization. "What's clearly missing are technical standards for comparing different systems," says Lee of MiraiBio. "There are several different technologies in the market," adds Elke Zimmermann, Eppendorf's product manager. "Our feeling is that producing arrays is not the only

critical step. It is also important to look in detail at all the different aspects of the arrays, including preparation, labeling, and data analysis, to know what you are doing exactly. It is very important to look at quality control and at standardization."

Dirk Vetter, CEO of Graffinity Pharmaceutical Design, echoes that thought. "Scientists are worrying about the data quality of microarrays," he says. "There's no really good way to validate whether you have produced good data or weak data. The field faces the danger of making decisions that involve spending a lot of time and money based on possibly poor data. You need a security filter because you have to have rock-solid data."

The issue has reached beyond the laboratory. "Standardization is definitely a problem right now. At a recent conference in Germany the discussion concerned the fact that researchers don't always believe in the results of other groups because they are using their own methods and standards," Zimmermann remembers. "There's some hesitation to join the club and be frank about results," concurs Vetter.

Scientists involved in the discipline have done more than complain about the lack of standardization. "I can hear people saying very loudly that they would like to form a committee or consortium to set standards on the quality of data from arrays," says Vetter. "Committees are already forming, but it will require quite a long-term effort and will represent a technical challenge."

Some companies have already started to meet the challenge. Affymetrix, for example, instituted internal controls from the start of its manufacturing. "They debugged early," says Vetter. "That may give them the opportunity to come out as a standard." Fodor adds that the company's manufacturing process, leveraged from semiconductor production technology, permits it to make arrays in wafers and to exert quality control over each lot.

Help with Home Brews

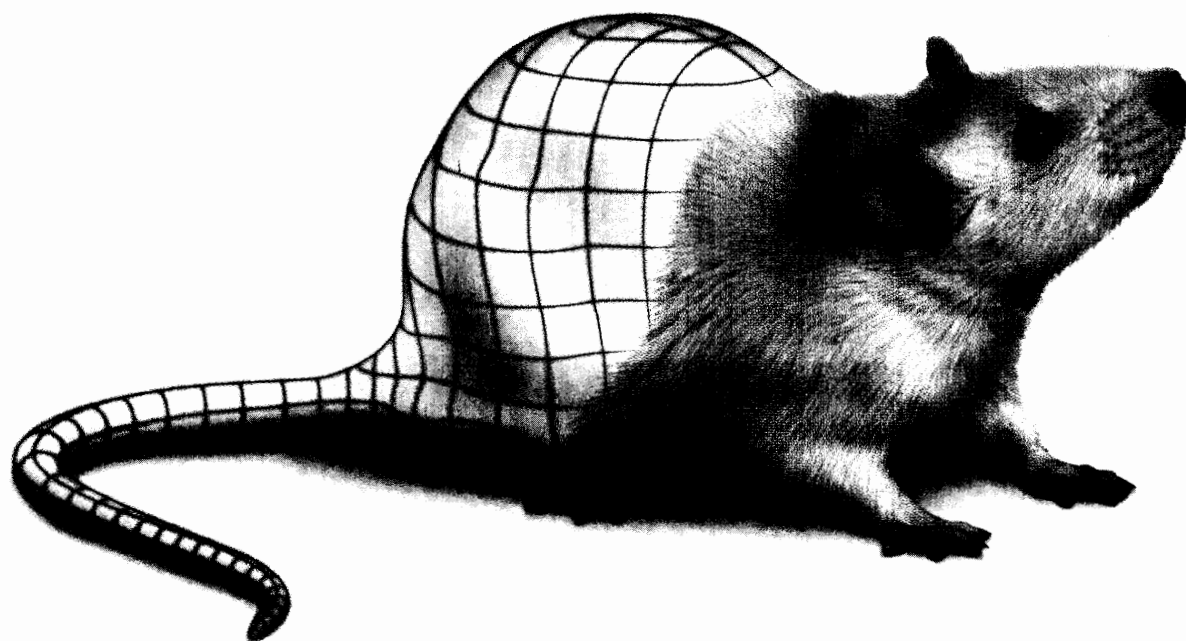
The issues of standards and quality control have the most obvious impact on life scientists who choose to go their own way in preparing microarrays. In fact universities and pharmaceutical and biotechnology companies now make life simpler for such scientists than it used to be half a dozen years ago. Research groups and departments in academic laboratories are joining forces to create core facilities for DNA microarray design, production, and even analysis. These facilities can provide a great deal of the expertise required for microarray work. In particular they eliminate the extensive training that each individual researcher requires before embarking on fully fledged microarray work. The core facility concept also allows individual researchers to work together and share the costs of this large financial investment required for production and other necessary microarray instruments.

Nevertheless, core facilities have their limitations. "There will always be people who like the control of having their own operation," says Chris Bailey, gene array product manager of Sigma-Aldrich. So several academic researchers continue to create and use do-it-yourself systems to produce their own DNA chips in the laboratory. Indeed, says Stratagene's Szabo, "The vast majority of experiments are being done with do-it-yourself arrays."

These rely largely on the robotic spotting system originally developed by Patrick Brown for his lab at Stanford. Brown has since made the protocols of his home-brewed technology available to other laboratories to permit them to produce their own DNA microarrays.

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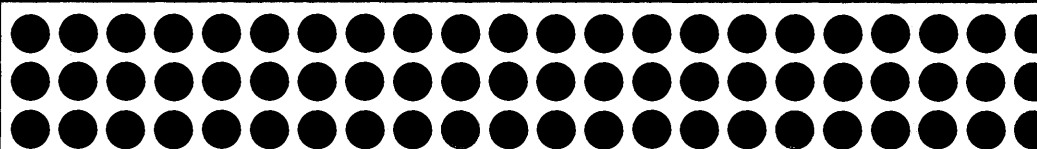
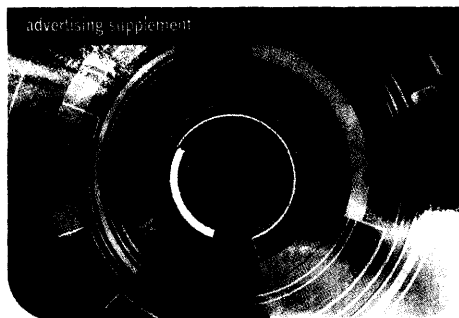
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As investigators associate specific SNPs with various diseases, they will develop diagnostic tests to screen... those at increased risk of disease.

Soon after the emergence of commercial microarray technology, several companies started to offer spotting systems for home-brew use. That represented a major advance for the many academic researchers who lacked the engineering expertise required to follow the practices of the Brown lab. Cartesian Technologies, Genetic MicroSystems and Packard Instrument, among others, continue to offer spotting instruments that are more affordable for the academic researcher.

Agilent has taken a new and different approach. "Our technology lets scientists define and then design their own arrays and bring those designs to us to print them," says Mel Kronick, the R&D manager for Agilent's bioresearch solutions group. "Scientists in our technology access program can choose the oligos they want to create for their designs and then have the arrays ready in a matter of days at a very reasonable cost. It's rather like extending the process of ordering oligos to arrays." Merger, meanwhile, offers full service for its range of arrays.

Do-it-yourself users of arrays stand to gain more than faster production at lower cost. "Everyone is so centered around human microarrays," says Simon Sims, manager of arrays for **Sigma-Genosys**. "But a significant proportion of scientists out there needs to have custom options to make their own chips for other organisms. We have developed applications for small arrays focused on, for example, apoptosis and the cytokine market. We offer very open systems." Certainly some mouse and rat arrays are available on the market. But the numbers of genes on those chips are underrepresented.

Several vendors provide ancillary products to home-brewers. "The vast majority of experiments are performed by researchers who have a need for simple biological tools to make their arrays and run them to collect useful data," says Strata-gene's Szabo. "Our mission is to provide the complementary tools to make the process reliable."

Applications of Arrays

What of the applications of microarrays? Structural genomics has emerged as the prime customer. This involves the determination of the genetic sequences in the DNA of living organisms, such as humans, mice, and *Drosophila*. It is a huge undertaking that will provide a strong foundation for studies of the function of these genes and of the discovery of drugs that can be used to alter aberrant metabolic functions.

During the week of 15 February 2001, both the government-funded **Human Genome Project** consortium and the privately funded **Celera Genomics** published their drafts of the human genome. Analysis of these genome sequences surprisingly revealed that the 3 billion base pairs that make up the 23 pairs of chromosomes of the human genome seem to code for no more than 30,000 to 40,000 genes. Scientists had previously believed that the figure would exceed 80,000. In addition to discovering why the new estimate falls so far short of expectation, the sequence data will provide extraordinary opportunities for life scientists to discover new targets for developing drugs and otherwise intervening in diseases.

The vehicle is functional genomics, which includes applications in such areas as expression profiling, SNP detection/diagnostics, and personalized medicine. Several pharmaceutical companies have drug discovery programs based on functional genomics. These include companies like **GENSET**, **Millennium Pharmaceuticals, Inc.**, and **Lion Biosciences**. DNA array technology provides a major tool in most functional genomics programs.

To understand the biochemical processes involved in the normal and diseased states of living cells, for example, researchers can use microarrays to detect differences in gene expression between different cells. The microarray permits researchers to examine thousands of different genes in the same experiment and thus to obtain a good understanding of the rel-

ative levels of expression between different genes in an organism.

Single nucleotide polymorphisms are likely to play a significant part in molecular diagnostics, because scientists know that several DNA base changes help to determine an individual's risk of developing a specific disease. As investigators associate specific SNPs with various diseases, they will develop diagnostic tests to screen populations of individuals for those at increased risk of disease. These tests will also prove valuable in screening asymptomatic individuals who are actually in the early stages of specific diseases at the time of screening. Identifying which SNPs are predictors for disease requires screening of many individuals to establish a pattern of SNPs versus disease states. Affymetrix has already developed a SNP microarray for this purpose. Called the GeneChip® HuSNP Mapping Assay, it has approximately 1,500 human SNPs per array.

Any ultimate goal of SNP analysis is personalized medicine. One aspect of the concept envisions doctors running drug metabolism profiles on their patients' DNA to determine how the individual patients will respond to certain commonly used drugs. The vehicle for the test: a SNP DNA microarray. Clinical researchers are on the verge of identifying a number of clinically relevant SNPs associated with cytochrome P450 and drug metabolism. As more information emerges in this area, biomedical researchers will gain a better understanding of the ways in which different individuals respond to the same drug treatment.

The Next Steps

Recent advances in DNA chip technologies have occurred primarily in the area of refining the process of creating DNA chips. Several newly developed spotters allow academic researchers to gain access to this technology. Affymetrix and other suppliers continue to invest heavily in creating new products to meet researchers' changing needs more effectively. Growing numbers of firms offer products and services to do-it-your-



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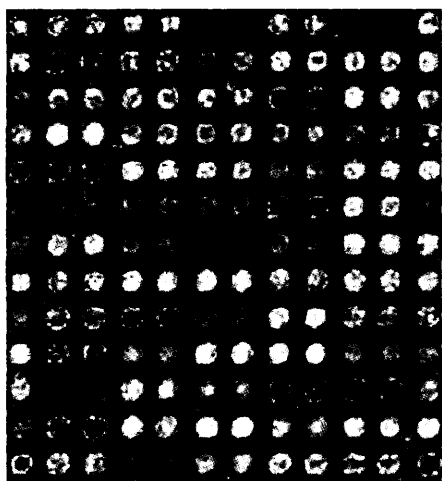
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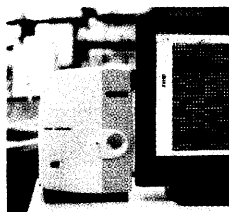
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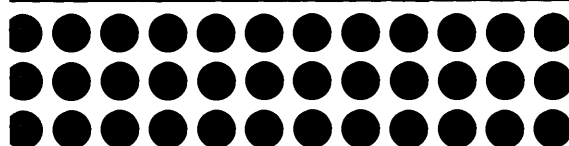
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Furthermore, there always seems to be a new company on the horizon promising ways to develop arrays and gain data from them more accurately, faster, and at a lower cost. "The whole business of microarray systems is going to change a lot," says Sarah Stevens of Genetix. "More and more companies are starting to manufacture premade arrays. A lot of groups working on common organisms will buy premade arrays to get the economies of scale in human, mouse, and *Drosophila* systems. But we will still see a market for do-it-yourself scientists working on unusual organisms and special organisms."

DNA chips will continue to create opportunities for researchers to discover drugs at faster and faster rates. It will also help them to discover important disease-related SNPs. This relatively young research tool has been quickly embraced by researchers and will be extraordinarily important in the process of scientific research and discovery, both now and in the future. "It's clear that the performance and sensitivity of the arrays haven't reached any limits set by any physical laws," says Stanford University's Brown. "The limits are simply set by the state of the technology. The underlying logic whereby array technology allows you to get the big picture of any biological process is so compelling that it will be played out for many years to come." ■

Peter Gwynne is a freelance science writer based on Cape Cod, Massachusetts, U.S.A. Gary Heebner is president of Cell Associates, a scientific marketing firm in Chesterfield, Missouri, U.S.A.

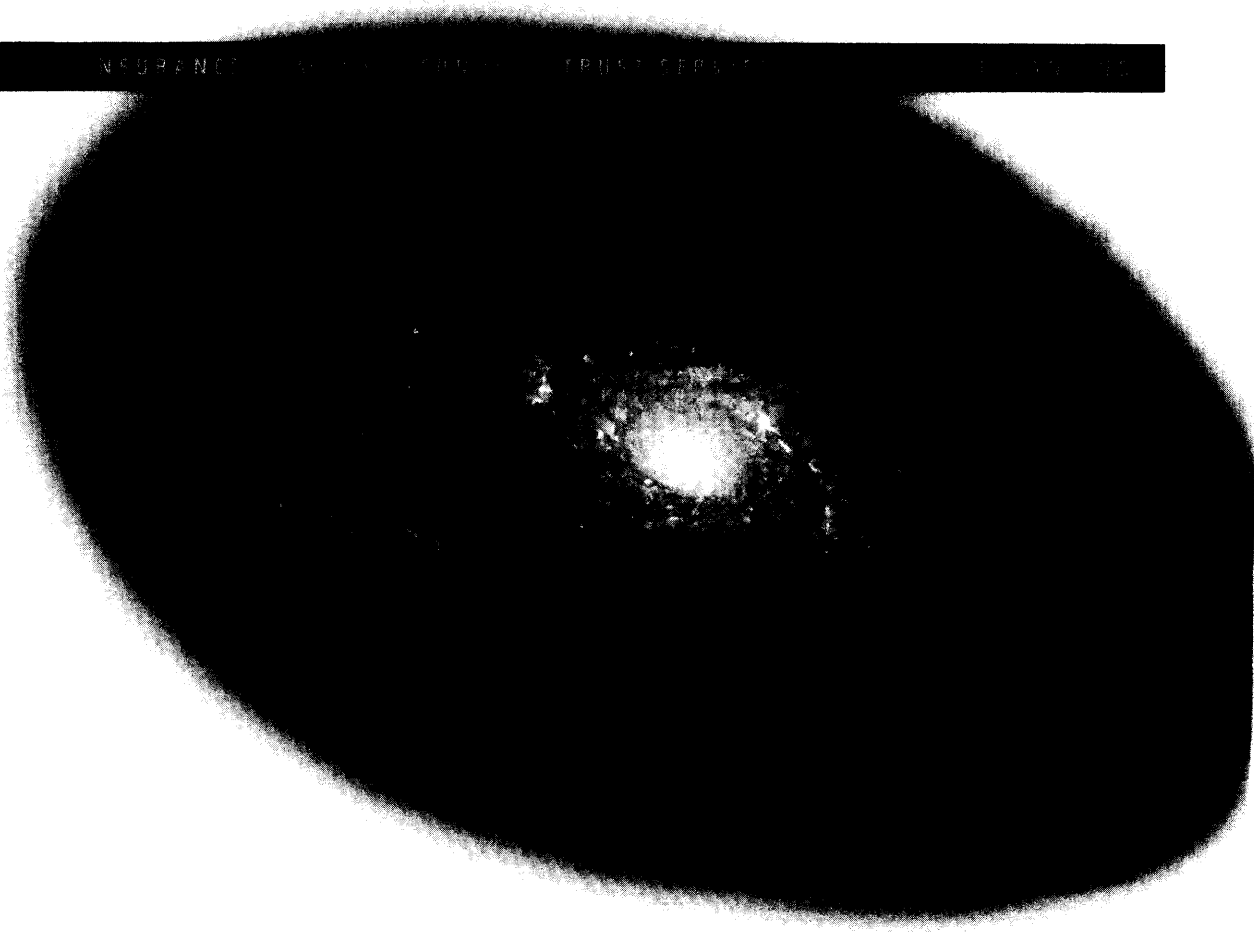
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POSITIONS OPEN

FACULTY POSITION IN FUNCTIONAL GENOMICS

University of Minnesota

The Stem Cell Institute and the Department of Medicine at the University of Minnesota invite applications for a tenured/tenure-track position at the **ASSISTANT/ASSOCIATE PROFESSOR** level. The Stem Cell Institute is dedicated to fundamental research in stem cell biology. To develop basic and future translational research efforts in multipotent stem cells such as ES, hematopoietic, neuronal, mesenchymal, hepatic, pancreas, and others, the Institute will recruit Investigators who examine the genetic and phenotypic characteristics as well as differentiation and maturation potential of stem cells. This cross-departmental Institute will foster interactions between Investigators with different expertise ranging from developmental, molecular and cell biology, physiology, and biochemistry.

The search is open to exceptional candidates at the level of Assistant or Associate Professor depending upon qualifications. Successful candidates will conduct research in either or both computational and experimental aspects of genomics. Examples of specific areas of functional genomics to be considered are bioinformatics, elucidating cell commitment and differential pathways or biological aspects of stem cells via gene expression, genomics, and/or proteomics. Salary and start-up funds will be competitive and commensurate with education and experience. Candidates must have a Ph.D. and/or M.D. degree and must be U.S. citizens or must be eligible to work at the University of Minnesota by date of hire.

Applications will be reviewed beginning May 14, 2001, and accepted until the position is filled. Applicants should send current curriculum vitae, statement of research interests and intentions, and three letters of reference to:

Stem Cell Functional Genomics
Search Committee
Attention: Lauri Andersen
(assistant to Catherine Verfaillie, M.D.)
Stem Cell Institute
University of Minnesota
Mayo Mail Code Number 716
420 Delaware Street S.E.
Minneapolis, MN 55455

The University of Minnesota is an Equal Opportunity Educator and Employer.

Two 12-month, tenure-track faculty positions: (1) **ASSISTANT/ASSOCIATE PROFESSOR**, landscape ecology; (2) **ASSISTANT PROFESSOR**, watershed hydrology. Qualifications include Ph.D. in related field and position-specific areas of expertise. Positions have teaching and research responsibilities. Contact: Jean Freestone, Department of Environmental and Resource Sciences, University of Nevada-Reno, 1000 Valley Road, Reno, NV 89512-0013. Telephone: 775-784-4020; e-mail: freestone@ers.unr.edu; or (Ecologist) Bob Nowak; Telephone: 775-784-1656; e-mail: nowak@cabnr.unr.edu; or (Hydrologist) Scott Tyler; Telephone: 775-784-6250; e-mail: styler@unr.edu. For complete announcement and requirements, see websites: <http://www.ag.unr.edu/naes/employ.htm> or <http://jobs/unr.edu>. Consideration of applications begins July 1, 2001. *Equal Employment Opportunity/Affirmative Action.*

ANATOMIST. Full-time **ASSISTANT PROFESSOR** to teach gross anatomy. Seventy-five percent research, 25% teaching. Doctoral degree and experience teaching medical gross anatomy required. Prefer candidates in evolutionary morphology, paleontology, physical anthropology, and Morphologists whose work may have clinical applications. Review of applications begins May 15, 2001, to continue until position is filled. Submit curriculum vitae (including funding record if appropriate); research and teaching statements; and names, addresses, and e-mail addresses of three references to: Nikos Solounias, Chair of Anatomy, New York College of Osteopathic Medicine, Old Westbury, NY 11568. E-mail: nsolouni@iris.nyit.edu.

POSITIONS OPEN

DEPARTMENT OF CELL BIOLOGY

The Department of Cell Biology, Faculty of Medicine and Dentistry at the University of Alberta, Canada, invites applications for a tenure-track position at the **ASSISTANT/ASSOCIATE PROFESSOR** level. We seek an individual who will complement and extend our existing strengths in neurobiology, cell signaling/cell cycle, protein targeting and organelle biogenesis, and cell-cell interactions. Applicants should have a Ph.D., a proven record of research achievement, and will be expected to apply for funding from the Alberta Heritage Foundation for Medical Research. The successful candidate will be expected to carry on an independent research program but will also have the opportunity for collaborative interactions with several multidisciplinary research groups within the University. A contribution to the Department's teaching program will also be expected. Please send curriculum vitae, a two-page statement of research interests, and arrange to have three letters of reference sent on your behalf to: **Dr. Richard Rachubinski, Chair, Department of Cell Biology, 5-14 Medical Sciences Building, University of Alberta, Edmonton, Alberta T6G 2H7 Canada.** Deadline for receipt of applications is July 31, 2001. Further information about the position and Department can be obtained at website: www.ualberta.ca/cellbiology. The records arising from this competition will be managed in accordance with provisions of the Alberta Freedom of Information and Protection of Privacy Act (FOIPPA). *The University of Alberta hires on the basis of merit. We are committed to the principle of Equity in Employment. We welcome diversity and encourage applications from all qualified women and men including persons with disabilities, members of visible minorities, and aboriginal persons. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. If suitable Canadian citizens and permanent residents cannot be found, other individuals will be considered.*

ASSISTANT/ASSOCIATE PROFESSOR Environmental Respiratory Biology and Genomics

The Department of Environmental Health, Molecular Toxicology Division, is seeking applicants for a faculty position to conduct research in respiratory molecular biology, molecular genetics, or functional genomics. Preference will be given to candidates interested in the genetic determinants of chronic obstructive pulmonary disease in model systems or in human populations. This individual will join a well-funded research program in respiratory cell biology and will be provided sufficient start-up funds to establish a laboratory. The successful candidate will have a Doctorate and postdoctoral research experience in a related field and a willingness to train graduate students and Postdoctoral Fellows in molecular biology in their laboratory. The Department of Environmental Health has over 40 faculty interested in ecogenetics, genetic toxicology, signal transduction, and population genetics and has graduate programs in environmental toxicology and molecular epidemiology. Submit curriculum vitae, research interests, names of three references, and three manuscripts to: **Ms. Amy Nawaz, Program Coordinator, Molecular Toxicology Division, University of Cincinnati, P.O. Box 670056, Cincinnati, OH 45267-0056.**

DIRECTOR WATER QUALITY LABORATORY

Heidelberg College seeks a new Director of the Water Quality Laboratory (WQL). The WQL's mission is to help protect the aquatic resources of Ohio, the Midwest, and the Great Lakes by assessing impacts of agricultural and other land uses. Applicants must possess a Ph.D. in the environmental sciences.

Heidelberg College is a small, private liberal arts college in northern Ohio. It has an established reputation for academic quality and outstanding teaching. Potential applicants are directed to website: www.heidelberg.edu/wql or e-mail: kkrieger@heidelberg.edu.



Postdoctoral Training in Structural Biology

Several St. Jude and NIH-funded postdoctoral positions are available to perform structural studies of (1) cell cycle regulatory proteins and (2) the Arf tumor suppressor using molecular and structural biology techniques, with emphasis on **Protein Structure Determination by NMR**. The St. Jude NMR Laboratory is equipped with two 600 MHz Varian INOVA spectrometers and will soon add an 800 MHz instrument. Further, St. Jude offers a collaborative, state-of-the-art research environment through access to a wide range of biophysical instrumentation (CD, fluorescence, calorimetry, BIACORE), high power computers (multi-processor SGI ONYX) and the new Hartwell Center for Bioinformatics and Biotechnology.

Applicants should have received, or soon receive their Ph.D. or M.D. degree with experience in biomolecular NMR, molecular biology, and/or protein biochemistry. St. Jude offers a very competitive benefits package including medical and dental coverage, relocation supplement and yearly professional development fund.

Please send c.v. and names of 3 references to: **Dr. Richard Kriwacki, Department of Structural Biology, St. Jude Children's Research Hospital, 332 N. Lauderdale, Memphis, TN 38105**, or by e-mail to: richard.kriwacki@stjude.org

www.stjude.org

AA/EOE



MAYO CLINIC POSTDOCTORAL POSITIONS

NIH-funded postdoctoral positions are available immediately to work in the area of DNA damage-signaling pathways and cancer biology. The lab currently focuses on the biochemical and molecular aspects of breast/ovarian cancer and the roles of tumor suppressor genes p53, Chk2, BRCA1/BRCA2 and the DNA damage-signaling pathway in tumorigenesis. The approaches we are using range from mammalian cell culture, molecular biology to mouse and yeast genetics. A strong background in molecular and cellular biology is essential. We are seeking candidates who are self-motivated and career-oriented. The research environment at Mayo Clinic is excellent. Prospective applicants are encouraged to contact me by e-mail at Chen.junjie@mayo.edu or letter to:

Junjie Chen, Ph.D.
Department of Oncology
Guggenheim Building, Room 1342
Mayo Clinic
200 First Street, SW
Rochester, MN 55905

See also: <http://www.mayo.edu/research/>

Mayo Foundation is an affirmative action and equal opportunity employer and educator.

Over \$1 Million Immediately Available to Elucidate the

BIOLOGICAL PATHWAYS INVOLVING THE ATM PROTEIN

- Up to \$75,000 per project per year
- Rapid, 30-day peer review decision process
- Early start date possible
- Application process not too burdensome

Over US\$1 million is now available to support truly novel research projects aimed at understanding the molecular basis of ataxia-telangiectasia (A-T). A major objective of grant awards will be to unravel the functional role of the ATM protein, especially in the development and maintenance of the brain, in collaboration with other labs that have already developed reagents such as ATM knock-out mice, monoclonal antibodies and biochemical assays for ATM activity. Projects with potential for identifying downstream therapeutic targets are of particular interest.

Competitive awards will be given to researchers for one- and two-year projects to be funded up to a total direct cost of \$75,000 per year. No administrative overhead or fixed costs are supported.

Scientific excellence, originality, investigator competence and direct relevance to Ataxia-Telangiectasia are the paramount criteria in award decisions. All applications will receive quick reviews and decisions will be communicated to applicants within 30 days after proposals are received. Grant periods can begin as early as 15 days after grants are awarded.

For proposal guidelines, contact the A-T Children's Project or visit our web site.

668 South Military Trail
Deerfield Beach, FL 33442
Web site: www.atcp.org



Phone: (954) 481-6611
Fax: (954) 725-1153
Email: grants@atcp.org

Golden Opportunities

COMPUTATIONAL BIOLOGY CONSULTANT

The University of Minnesota Supercomputing Institute seeks to hire a person with a computational biology, biochemistry, bioinformatics or genomics background to join a dynamic group that provides high level of technical support for researchers at the University of Minnesota Supercomputing Institute.

For detailed information on this position, please see www.msi.umn.edu or send letter of interest and resume to:

Ann Johns
Supercomputing Institute
University of Minnesota
1200 Washington Avenue South
Minneapolis, MN 55415
Email: annj@msi.umn.edu

UNIVERSITY OF MINNESOTA
Equal Opportunity Educator and Employer



Avigen, Inc. is a leader in the development of gene therapy based on adeno-associated virus (AAV) for the treatment of inherited & acquired diseases. Our continued growth has created the following openings in our Alameda, CA facility for experienced and self-motivated professionals to join our expanding Team.

SENIOR FORMULATION SCIENTIST

We are seeking a highly qualified scientist to fill a key role in the development of recombinant AAV vectors for human clinical trials. The successful candidate will have a strong background in the optimization of formulation and stability of biotechnology products, ideally viral vectors. A good working knowledge of relevant FDA regulations and cGMP required. Experience in vector purification process optimization and scale-up a plus. Candidates must have a PhD, 3+ years of relevant experience, and excellent communication skills.

VALIDATION MANAGER

The successful candidate will manage all validation functions for GMP activities, develop procedures and policies to support Avigen's growth and expansions plans, and ensure that all validation activities comply with the cGMP's, other relevant regulations and current industry practices. Basic responsibilities include, but not limited to, developing Master Validation Plans, manage validation and revalidation program, interact with Facilities, QA and Manufacturing to ensure cGMP compliance and develop, review and approve validation protocols. Basic requirements are BS Degree in scientific or technical field, 5-8 years in validations, exp. in start-up of new facilities, and thorough working knowledge of FDA and cGMP.

LOGISTICS MANAGER

This position will manage all production planning, scheduling, dispensing and inventory functions for GMP materials. The Logistics Manager will be responsible for training and supervising personnel, inventory movement execution, inventory record accuracy, manage dispensing activities, track and manage the release of manufactured products, manage vendors and write SOP's and establish policies to ensure compliance with FDA regulations.

Requires a Bachelors Degree in a scientific field, 2-5 years experience in materials management or production planning in an FDA regulated environment, experience in developing and managing material control organizations in both startup and commercial environments, thorough working knowledge of FDA and GMP requirements for areas of responsibilities and strong verbal and written communication skills.

PRODUCTION MANAGER

Experienced individual to be responsible for planning and scheduling production research grade (non-GMP) viral vectors for gene therapy. Coordinate production plans and provide input to management concerning review prioritization and status of production orders. Coordinate report of assay results. May supervise associates in the production process. Will work on problems of diverse scope where analysis of data requires evaluation of identifiable factors. Demonstrated experience in exercising judgment within generally defined practices and policies in selecting methods and techniques for obtaining solutions. Requires a Bachelors degree or equivalent with a minimum of 2-5 years of related experience.

MATERIALS COORDINATOR

Responsible for activities related to the receiving, shipping and storing of materials. Ensures materials are received from proper vendors, delivered, packaged according to specification and shipped in a timely manner. Ensure the quality of materials received are correct, the security and accountability of materials and goods with inventory control, materials are available to meet production schedules and/or products are shipped as per schedules. Establishes and modifies operational methods and procedures. Previous experience in shipping and receiving and pharmaceutical industry experience preferred.

DEVELOPMENT ASSOCIATES

We are seeking experienced Development Associates to play key roles in a core facility for AAV vector production and characterization. A background in virology / viral vectors, and experience in cell culture and virus purification required. Candidates must have a BSc or MSc degree, and 3+ years relevant experience. Industry / cGMP experience a plus. A background in virology / viral vectors, and experience in assay development and assay validation is required.

QUALITY ASSURANCE SPECIALIST

We are seeking a QA professional, a detail-oriented individual familiar with team interactions and excellent, demonstrated communication skills. Responsibilities will include: working with us to ensure compliance to cGMP in our new facility, review of Batch Production records and supporting data, investigation reports and change control/corrective action closure activities. Join us and we will provide a supportive management team and an opportunity to work in the cutting-edge field of gene therapy.

Requirements include a BS in an appropriate scientific discipline and 3-5 years experience in the pharmaceutical or bio-pharmaceutical industry, working experience in, and knowledge of Quality Systems, proven detailed data and Batch Production Record review experience, administration of change control and deviation systems and expertise in compliance oversight and training is desirable

QUALITY ASSURANCE ASSOCIATE

The successful candidate will inspect and evaluate incoming raw materials and components used in manufacturing in accordance with the current raw material specifications and will be responsible for sampling raw materials using aseptic technique. Previous experience in Manufacturing, Quality, Materials or Inventory Control from a pharmaceutical, biopharmaceutical, or medical device company desired. Candidate must be able to lift up to 40 lbs. and attention to detail is essential. Associate Degree or 2 years of relevant experience in a related industry is a plus. Knowledge of cGMP is preferred.

QUALITY CONTROL ANALYST II

Opportunity for an experience individual who will be responsible for conducting routine and non-routine analysis of raw materials, in-process, finished products and stability samples according to SOPs, develop, validate/qualify, and improve assays for better efficiency and consistent results. Requires: a BS in Microbiology, Biology, Molecular Biology or Chemistry; 3-5 years biotech/pharmaceutical work experience; and familiar with SDS-PAGE, Western/Southern blot, cell-based potency assays, LAL, DNA hybridization, protein assay, PCR and GLP/GMP. HPLC a plus. Solid computer skills (MS Excel and Word). An organized, detail-oriented professional with excellent teamwork skills is ideal.

QUALITY CONTROL ANALYST III

Looking for experienced QC Analyst to be responsible for conducting routine and non-routine analysis of raw materials, in-process, finished products and stability samples according to SOPs. Will also develop, validate/qualify, and improve assays for better efficiency and consistent results. An organized, detail-oriented professional with excellent teamwork skills is ideal. Position requires: a BS in Chemistry, Microbiology, Molecular Biology or Biology; 5-8 years biotech/pharmaceutical work experience; and familiar with HPLC, SDS-PAGE, Western/Southern blot, cell-based potency assays, DNA hybridization, wet chemistry, PCR and GLP/GMP. TOC a plus. Solid computer skills (MS Excel and Word).

We offer competitive salaries, benefits paid in full by the Company, stock options, 401(k), growth potential and an exciting opportunity to work with a dynamic team. To apply, email/send/fax resume, SPECIFYING POSITION OF INTEREST, to: Avigen, Inc., Human Resources, 1301 Harbor Bay Parkway, Alameda, CA 94502; e-mail: sdelph@avigen.com, fax: (510) 748-7371. EOE - Principals Only - NO CALLS.

Assistant/Associate Scientist

The Biology Department of Brookhaven National Laboratory (BNL) presently has an opportunity for a cryo-electron microscopist to solve macromolecular protein structures. This is a tenure-track position to establish a new, independent research program for biological structures using frozen-hydrated EM. Candidates must have a Ph.D. in biochemistry or biophysics and postdoctoral experience related to protein structure analysis using electron microscopy. Facilities available include a new 200 keV FEG TEM with tilt-cryostage, and access to the STEM facility and National Synchrotron Light Source. Successful candidates will be expected to work in collaboration with other biologists at BNL and institutions such as the State University of New York at Stony Brook, and to participate in a newly created Center for Complex/Membrane Protein Structures.

BNL is a multidisciplinary laboratory engaged in basic and applied research and is managed by Brookhaven Science Associates under contract with the Department of Energy (DOE). BNL's Biology Department has strong programs in molecular genetics, structural biology, genomics, and biotechnology and has a close association with BNL's Medical Department and the Center for Imaging and Neuroscience. The nearby State University of New York at Stony Brook has excellent graduate programs in many other areas of the life sciences. Further information about the Biology Department and the BNL is available at www.bnl.gov.

Applicants should send a letter of interest, curriculum vitae, and the names, addresses, telephone numbers, and e-mail addresses of three references by June 30, 2001 to: Search Committee - CryoEM, Biology Department, Bldg. 463, Brookhaven National Laboratory, Upton, NY 11973. BNL is an Equal Opportunity Employer.

BROOKHAVEN
NATIONAL LABORATORY

www.bnl.gov



St. Jude Children's
Research Hospital
ALBAAC - Danny Thomas, Founder

Director - Scientific Editing Department of Scientific Editing (Job Code: SCI-5680VH)

Functions as administrative head of scientific editing department. Edits and/or rewrites scientific papers and grant applications. Educates and trains departmental staff in scientific writing and editing. Responsible for the publication of the *St. Jude Scientific Report* and various in-house publications. Master's Degree required in an area related to biomedical editing and writing. Ph.D. in a relevant scientific field helpful. A minimum of five years relevant experience required, preferably on the staff of a peer-reviewed journal or institutional editing group.

St. Jude Children's Research Hospital offers an excellent salary and fringe benefits package and will cover the cost of interview travel as well as provide relocation assistance. For more information or to submit a resume contact St. Jude Children's Research Hospital, Human Resources Department - (Job Code), 332 North Lauderdale, Memphis, TN 38105. Fax: 901-495-3123. E-mail: exec.careers@stjude.org

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UNIVERSITY
OF BERGEN

Professor of Aquaculture

Applicants must be able to document broad experience in relevant research and teaching. The position requires international stature in one or more of the following areas: basic studies of the early life stages of cultured marine fish species; environmental, genetic and physiological regulation of the growth and development through larval and juvenile stages (early life history up to and including metamorphosis); regulation and characterisation of the quality of juvenile fish and/or optimisation of the environmental condition in culture.

More at <http://www.uib.no/stilling>.

Submit application in six copies, sorted into six bundles, to the University of Bergen, MN-faculty, POBox 7800, N-5020 Bergen, Norway, before May 28, 2001.

Professor of Fish Health

Applicants must be able to document broad experience in relevant areas of research and teaching. The position requires international stature in one or more of the following areas: basic fish immunology and pathology, characterisation and diagnostics of pathogens and/or basic studies of vaccines directed towards early life stages (up to and including metamorphosis) of fish species with potential for aquaculture and with emphasis on biological processes.

More at <http://www.uib.no/stilling>.

Submit application in six copies, sorted into six bundles, to the University of Bergen, MN-faculty, POBox 7800, N-5020 Bergen, Norway, before May 28, 2001.

CICERO no



Department of Biological Sciences Extracellular Matrix Biology Assistant Professor

The Department of Biological Sciences at the University of Delaware invites applications for a tenure-track faculty position at the ASSISTANT professor level in support of our newly established extracellular matrix (ECM) biology program. Outstanding candidates are sought for a microbiologist, immunologist, developmental biologist, neurobiologist, or cell biologist. Likely areas of research specialization include cell-matrix interactions, matrix turnover, and matrix remodeling. Molecular and/or genetic techniques must be used, although the specific experimental system is open.

Requirements for the position include a Ph.D. or equivalent degree, a minimum of two years postdoctoral experience, and a strong commitment to both research and education at the graduate and undergraduate level. The person hired will be expected to develop an active research program, pursue extramural funding, and participate in undergraduate and graduate education.

The successful candidate will occupy a newly built laboratory and receive a competitive salary and startup package. The Department of Biological Sciences (www.udel.edu/bio/) consists of 38 faculty with research interests ranging from molecular biology to ecosystems studies and currently has 35 students in its M.S./Ph.D. program. Departmental resources include confocal microscopy, transgenic animals, antibody production, DNA sequencing, and flow cytometry and are supplemented by access to core facilities in the Delaware Biotechnology Institute (www.dbi.udel.edu/).

Please submit a complete curriculum vitae, a description of research interests, and the names of three references with contact information to: **Dr. Dan Carson, Chair, Department of Biological Sciences, University of Delaware, Newark, DE 19716-1590**. Review of applications will begin upon receipt, but the application deadline is July 1, 2001. The starting date for these positions is January 1, 2002 or later. For additional information concerning this position, the department, and community resources, please go to <http://www.udel.edu/bio/news/facultysearch/>. The UNIVERSITY OF DELAWARE is an Equal Opportunity Employer which encourages applications from Minority Group Members and Women.

The highly successful Statistical Science Group within AstraZeneca is expanding its activities in the US. In order to support this expansion, a Statistical Science Group has built research laboratories in Waltham, MA. As a result, AstraZeneca has a number of opportunities at this site.

ONE GLOBAL FORCE

FIRST FOR INNOVATION

o Statistical Scientists

You will provide statistical support and consultation to a variety of functional areas to assist in the drug development process and add value to the business. Acting as an independent statistical consultant, you will be required to develop and apply a variety of statistical and problem solving skills to support a broad range of activities in traditional areas such as HTS, in-vitro and in-vivo screening to areas of new technology such as genomics, computational chemistry and statistical genetics. You will work both independently and with the scientists in biology, chemistry and informatics as part of a multidisciplinary global project team, often with global objectives.

The successful candidate will have a Ph.D. with substantial statistical content, along with experience of statistical consultation within a biological/chemical environment. You will be familiar with the use of multivariate and appropriate data mining techniques as well as general visualization tools to improve the exploitation of a growing volume of complex data.

Candidates interested in contributing to the momentum of success at AstraZeneca, please forward your resume, indicating Reference Code: "Science 5-04", to: **AstraZeneca R&D Boston, 35 Gatehouse Drive, Waltham, MA 02451; E-mail: hr@astrazeneca.com; Fax: 781.839.4500.** Diversity is the essence of our science, our careers and our lives. We are an equal opportunity employer.



One powerful source for your career: www.astrazeneca-boston.com



DIRECTOR MICROMEDICAL DEVICE (MicroMD) LABORATORY

The College of Engineering at The Ohio State University is accepting applications for Director - Micromedical Device (MicroMD) Laboratory. The Director will assume responsibility for the operation, management, and business development of this premier biomedical research facility in Columbus, OH. Incumbent will provide leadership in both the day-to-day and long-term business and marketing aspects of the facility. The MicroMD Lab, which is currently under construction, is expected to be operational in autumn 2001 and will be utilized by the university, industry and other outside entities as a fee-for-service entity. The lab will include both clean room microfabrication facilities and biological sciences facilities and will focus on fabrication of microelectromechanical devices suitable for medical diagnostics and therapeutics.

Qualified candidates must have a master's degree; business development and marketing expertise with a background in administration of an academic research laboratory with close industrial collaborations; doctoral degree or an equivalent combination of education and experience desired; five years of management experience desired. Although knowledge of the technical aspects of the laboratory is desired, the director must have a substantial background in management and marketing as they relate to university and industrial customers. Salary is competitive and negotiable.

Ohio State offers a diverse, challenging work environment and supports growth and personal achievement through education and rewards. The university offers one of the most comprehensive benefit packages in the nation which includes medical, dental, vision, and life insurance; tuition authorization; paid vacation and sick leave; ten paid holidays; and Public Employees Retirement System of Ohio (PERS) or Alternative Retirement Program (ARP).

To learn more about the university, visit our Web site at www.ohio-state.edu. To assure consideration, send cover letter indicating position #16874-5C1 and two (2) resumes to: **Employment Services, The Ohio State University, 250 Northwood & High Building, 2231 North High Street, Columbus, OH 43201.** Resumes will be considered until the position is filled.

The Ohio State University is an Equal Opportunity, Affirmative Action Employer. Women, minorities, veterans, and individuals with disabilities are encouraged to apply.



NATIONAL INSTITUTES OF HEALTH
NATIONAL EYE INSTITUTE

Job Opportunities

The National Eye Institute Intramural Program at the NIH campus, Bethesda, MD., is seeking highly qualified Postdoctoral Fellows, Research Associates and Staff Scientists in the following areas:

- Molecular Biology
- Cell Biology
- Immunology
- Psychophysics
- Biochemistry
- Epidemiology
- Biostatistics

Salaries range from \$29,000 to \$118,400 per annum, based on experience and type of appointment.

NEI offers an extensive benefits package that you may be eligible for, depending on the appointment mechanisms: Health Benefits, Life Insurance, Retirement Benefits, Annual and Sick Leave, Formal Training Program, Recruitment Bonus, Retention Allowance, Relocation Allowance, Loan Repayment Program, and Travel Benefits.

Candidates interested in specific job opportunities at the NEI may visit the NEI web site at <http://www.nei.nih.gov/> listing the most current positions available.

NIH/NEI is an Equal Opportunity Employer

COMPUTATIONAL STRUCTURAL AND FUNCTIONAL GENOMICS

University of California, Berkeley

POSTDOCTORAL POSITIONS are available immediately in computational structural and functional genomics at UC Berkeley. Research areas include prediction of gene function using genomics and phylogeny; structural genomics and structure analysis; homology detection from sequence and structure; or any related area of computational molecular biology. Applicants should have a PhD and programming experience.

For these Postdoctoral positions only, please send a summary of scientific interests, CV, reprints, and reference letters to: Dr. Steven E. Brenner, 111P Koshland Hall, University of California, Berkeley, CA 94720-3102, or email to jobs@compbio.berkeley.edu. For additional information, visit our website at <http://compbio.berkeley.edu/jobs/>.

Lawrence Berkeley National Laboratory

The Berkeley Structural Genomics Center in The Physical Biosciences Division aims to provide 3D structures or models for all proteins in *M. pneumonia*. NIH-funded computational biology positions include:

HEAD OF INFORMATICS PB/012992/SC: Manage 4-person informatics group and architect/implement target selection, data management, and structure/function analysis.

GENOMICS PROGRAMMER PB/013028/SC: Implement and deploy computational structural genomics systems. Must have advanced degree or equivalent in Computer Science or Molecular Biology.

COMPUTATIONAL BIOLOGIST PB/013178/S: Perform computational structural genomics research. Prefer PhD or equivalent with background in computational and structural biology.

For additional LBNL job and application details, visit our website at <http://www.strgen.org/jobs/>.

The University of California and Berkeley Lab are Equal Opportunity/Affirmative Action Employers.

Assistant or Associate Professor Department of Medicine Division of Digestive Diseases University of California at Los Angeles

The Department of Medicine invites outstanding applicants for a tenure track, FTE-supported faculty position at the Assistant or Associate professor level. The successful candidate will be expected to have developed a strong, extramurally supported, independent research program in **Liver-Directed Gene Therapy**. The Division of Digestive Diseases Hepatology program is the largest in the U.S. and is supported at the UCLA campus by strong academic programs including the UCLA Human Gene Medicine Program, the Department of Human Genetics and the Dumont Liver Transplant Program. Applicants must have an M.D. and/or Ph.D. degree or equivalent and an excellent record of research productivity and quality. Submit curriculum vitae, a statement of research plan and the names (with e-mail addresses) of three references to:

**John S. Andrews, Division Administrator
Division of Digestive Diseases
Department of Medicine
UCLA School of Medicine**

Joandrews@mednet.ucla.edu

The University of California is an Equal Employment Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

LABORATORY OPPORTUNITIES Franklin, MA

IMPATh Predictive Oncology is a wholly owned subsidiary of IMPATh Inc., and provides translational genomics products and services to biotech and pharmaceutical companies world-wide. Due to continued expansion, we have the following opportunities available in our state-of-the-art cancer-focused research/clinical laboratory based in Franklin, Massachusetts.

ANATOMIC PATHOLOGIST

The candidate we seek will conduct quality assurance histopathologic review of tissues submitted for our Genebank Program. Additionally, you will be responsible for high-volume frozen section examination for confirmation of tumor type and content. Successful candidate will be an M.D. who successfully completed a U.S. Residency in Anatomic Pathology and is CAP Board certified or eligible.

HISTOCHEMISTRY TECHNICIANS

These positions require expertise and technical competence in frozen tissue sectioning, and routine histology. You will be responsible for carrying out laboratory analyses in compliance with GLPs in support of ongoing research and development in cellular oncology. In this role, you will also participate in quality control, instrument calibration and routine laboratory maintenance. Successful candidates will have a Bachelor's Degree or HT/HTL Certification, and a record of achievement in a clinical or research laboratory.

We offer competitive salaries and a comprehensive benefits package. For immediate consideration, please fax (310)482-5510, email: lahr@impath.com, or send your resume, indicating position of interest, to: IMPATh Inc., HR Dept-AC/MA, 5300 McConnell Avenue, Los Angeles, CA 90066. EOE M/F/D/V

 **IMPATh**
The Cancer Information Company

www.impath.com



Coordinator, Flow Cytometry/Confocal Microscopy Research Core Facility

A full-time position as Coordinator, Flow Cytometry/Confocal Microscopy Research Core Facility is available immediately at the Mayo Clinic Scottsdale, Scottsdale, AZ. This position is responsible for the supervision and coordination of all activities of the Flow Cytometry/Confocal Microscopy Research Core Facility including operation and maintenance of a FACS Vantage Cell Sorter, FACScan Flow Cytometer, and Zeiss LSM 510 Confocal Microscope. This position will provide technical expertise and collaborative support to research staff in the planning, design, execution, and interpretation of experiments using these technologies. Additionally, this position will provide education and instruction in the proper use of flow cytometry/confocal microscopy technologies and techniques to research staff. Position requires a BS/MS in Immunology, Cell Biology, Molecular Biology or equivalent with 3-5 years of flow cytometry and confocal microscopy experience. A competitive salary and benefits package is available.

Applications along with curriculum vitae and all relevant publications should be sent to **Mr. Owen E. McClure, Mayo Clinic Scottsdale, SC Johnson Medical Research Building, 13400 E. Shea Boulevard, Scottsdale, AZ 85259**. Informal inquiries about the position should be addressed to Mr. Owen E. McClure by e-mail at: mcclure.owen@mayo.edu. The closing date for applications is May 31, 2001.

Mayo Clinic is an Equal Opportunity and Affirmative Action employer.

Global Science & Technology Week

MAY 6-12, 2001

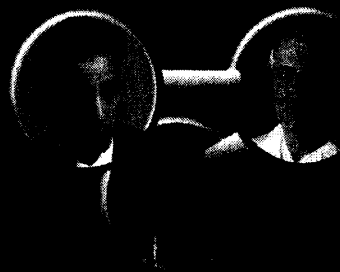


GLOBAL SCIENCE & TECHNOLOGY WEEK

(GSTW) will highlight the international nature of science and underscore the importance of math and science education in today's era of globalization. Activities in support of GSTW are taking place from coast to coast. To find out how you can take part in these events or to incorporate the ideas behind GSTW in your local community, log on to

<http://www.ostp.gov/htmlgstw.html>

GLOBAL SCIENCE & TECHNOLOGY WEEK is a project of the White House Office of Science and Technology Policy and the Office of the Science and Technology Adviser to the Secretary of State.



Leading the Way for a Healthier World

Lead the way! Become a leader by furthering your career and experience with one of the world's largest research-based companies. At Genetics Institute, a unit of Wyeth, your knowledge will help lead the way into a healthier world. The Division of Molecular Genetics, part of the Genomics Department at Genetics Institute and Wyeth Research, is a dynamic team using the latest in transgenic and gene-targeting technologies to evaluate and validate targets for drug discovery. Projects involve research in diseases of the central nervous system; bone and cartilage; the immune system; and in the areas of cancer, infectious diseases and Women's Health. We currently have staff openings at our research facility in **Andover, MA**.

Molecular and Cell Biology - Women's Health

- Molecular and phenotypic characterization in transgenic and gene-targeting projects for the development of therapeutic agents in studies of bone biology. Other projects may involve research in diseases relevant to Women's Health.
- Candidates must have expertise in molecular cloning and gene analysis, and should be familiar with a broad range of genomics technologies including DNA chip analysis.
- BS or MS in a relevant area of biology, along with 3-5 years of relevant laboratory experience.

Molecular and Cell Biology - Metabolism and Immunology

- Molecular and phenotypic characterization in transgenic and gene-targeting projects for the development of therapeutic agents. Research projects will focus on diabetes and on diseases of bone, cartilage and the immune system.
- Candidates must have expertise in molecular cloning and gene analysis, and should be familiar with a broad range of genomics technologies including DNA chip analysis.
- BS or MS in a relevant area of biology, along with 3-5 years of relevant laboratory experience.

Postdoctoral Fellowship

- Utilize transgenic and gene targeting technology in mice to functionally characterize novel genes and to evaluate potential targets for drug discovery in disorders of bone and cartilage, metabolism, the immune system or cancer.
- Work with a team of scientists to develop enhanced, high throughput transgenic and gene targeting methodologies.
- Ph.D. in Molecular Biology or a related field. A proven track record in the production and characterization of transgenics and knockouts is a plus.

Genetics Institute, a unit of Wyeth, the Pharmaceutical Division of American Home Products, offers competitive salaries and benefits, including comprehensive health care, dental and life insurance, matching 401(k), pension plan, relocation assistance, dependent care subsidy, and an on-site exercise facility. Genetics Institute is proud to be an equal opportunity employer, dedicated to building strength through diversity. Please forward your resume with salary requirements to: **Genetics Institute, Reference OPSCI, P.O. Box 7886, Philadelphia, PA 19101-7886. Fax to: (610) 989-4854. Email: jobs@labs.wyeth.com**

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For more information, please visit our websites at: www.genetics.com or www.wyethjobs.com

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UofL Health Sciences Center

Postdoctoral Positions in Spinal Cord and Head Injury Repair

The Kentucky Spinal Cord Injury Research Center (KSCIRC) at the University of Louisville School of Medicine is seeking multiple qualified postdoctoral candidates. The KSCIRC is an interdepartmental, multidisciplinary and highly collaborative group of investigators that is developing strategies for CNS repair that range from the molecular to systems analyses. The investigators and their research areas are listed below:

Evelyn Gozal - Signal transduction pathways mediating neuronal survival and brain adaptation to chronic and intermittent hypoxia; **Girish J. Kotwal** - Modulation of inflammatory response following spinal cord and head injury using vaccinia virus complement control protein; **David S.K. Magnuson** - Neuron replacement and locomotor systems in the spinal cord; **Stephen M. Onifer** - Cellular and molecular strategies for functional neuroregeneration; **Matthew Qiu** - Molecular control of motor neuron and oligodendrocyte development; **Fred J. Roisen** - Human olfactory neurosensory epithelial neural progenitors for repair of spinal cord injury; **Gregory E. Rutkowski** - Development of bioartificial devices for neural tissue replacement and repair; **Christopher B. Shields** - Acute surgical and pharmacological approaches for spinal cord repair; **Scott R. Whittemore** - Molecular and stem cell therapies for CNS repair; **Xiao Ming Xu** - Cell transplantation and neurotrophic factors in spinal cord regeneration.

Applicants should have a Ph.D. and/or M.D. degree. Send a curriculum vitae, an indication of which investigators are of greatest interest, and have at least 3 references forwarded by May 15, 2001 to: **Scott R. Whittemore, Ph.D., Department of Neurological Surgery, University of Louisville, 210 E. Gray St., Suite 1102, Louisville, KY 40202.**

The University of Louisville is an Equal Opportunity/Affirmative Action Employer and encourages applications from women and minority groups.

Join our Dynamic BioChip Group

Packard BioChip Technologies, Inc., a division of Packard BioScience, has the following opportunity available in our MERIDEN, CT Location.

Research & Development Director

Your main focus will be on product development, assay development and validation as opposed to basic research. You will develop and launch pre-spotted biochips containing content or biochips kits for specific assays as products for selected chip markets. You will be responsible for leading, directing and day-to-day management of the R&D projects conducted by a team of individuals in the biochip division to execute the strategic objectives of the company. As the director, you will play a critical role in assessing the appropriateness of the content for the marketplace and the viability of chips. In addition to the development of content biochips and value added chips assay kits, you will assess the readiness and completeness of chip substrates for commercialization, and execute programs to complete readiness for commercialization. Activities will include defining and executing R&D plans according to schedule and product milestones and within budget goals; directing and mentoring R&D group leaders and individual scientists and other research personnel; acting as a liaison with extramural researchers; collaborating with business development, marketing, engineering, and chip production personnel; maintaining intimate understanding of relevant science and technology; and providing key input as to the market viability of the protein assay chips in our chips pursuits decision process.

To qualify, you must have a Ph.D. in life sciences particularly protein biochemistry, proteomics, protein analysis, protein assay development, molecular biology, protein expression, solid phase reactions and biological assays. You must have at least 10 years laboratory experience in life science research; 5 years demonstrated experience in conducting and completing applied research or product development programs; and at least 4 years experience in directing technical personnel. The ideal candidate will be able to lead an applied research program and direct R&D group leaders and project managers. You must have broad knowledge of life science research, especially protein biochemistry, protein assays and assay development, and proteomics applications; and excellent written communication, and supervisory skills. The capabilities to work in a laboratory and chip production environment and the flexibility to travel domestically and internationally are also required.

We offer a competitive salary, comprehensive benefits, and the excitement of working for a leader in life science research. If you have the background we seek and are ready for a challenge, please send your resume and cover letter, including salary requirements to: Linda Hiscock, HR Dept, Packard BioScience, 800 Research Parkway, Meriden, CT 06450; Fax (203) 639-2331; email lhiscock@packardinstrument.com. Visit our website at www.packardinstrument.com



**Packard
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THE CHINESE UNIVERSITY OF HONG KONG

Applications are invited for:-

Department of Biochemistry

Assistant Lecturers (carrying the academic title of Lecturer) (Ref. 01/039(665)/2) (closing date: 25 May 2001)

Applicants should have a PhD degree plus University-level teaching experience, and specialize in one or more of the following areas: (i) molecular developmental biology; (ii) protein biochemistry; (iii) bioinformatics; or (iv) clinical biochemistry. The appointees are required to (a) teach courses offered by the Department for study programmes in Medicine, Biochemistry, Molecular Biotechnology, Food & Nutritional Science, Environmental Science, and Chinese Medicine; and (b) undertake research in collaboration with faculty members of the Department. Appointments will initially be made on two-year contract basis, with prospect for re-appointment on a longer term basis thereafter subject to mutual agreement.

Annual Salary and Fringe Benefits

Assistant Lecturer: HK\$403,740 - HK\$516,720 (approx. exchange rate in April 2001: £1 = HK\$11.2; US\$1 = HK\$7.75). Starting salary will be commensurate with qualifications and experience.

Benefits include leave with full pay, medical/dental care and hospitalization benefits as appropriate, plus a contract-end gratuity and University contribution to retirement scheme (totalling up to 15% of basic salary).

Further information about the University and the general terms of service for teaching appointees is available on our homepage: <http://www.cuhk.edu.hk>.

Application Procedure

Please send full resume, copies of academic credentials, a publication list and/or abstracts of selected published papers, together with names and addresses (fax numbers/e-mail addresses as well, if available) of three referees to whom applicants' consent has been given for their providing references if and when requested by the University (unless otherwise specified), to the Personnel Office, University Administration Building, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong (Fax: (852) 2603 6852) on or before **25 May 2001**. The Personal Information Collection Statements will be provided upon request. Please quote the reference number and mark 'Application - Confidential' on cover.



UNIVERSITY OF
CALGARY

Head, Department of Microbiology & Infectious Diseases

Creating the future of health.

The Faculty of Medicine invites applications and nominations for the position of Head, Department of Microbiology & Infectious Diseases. The Department of Microbiology & Infectious Diseases is part of the rapidly growing Faculty of Medicine which is in the process of building a major new research facility. The Department comprises 23 full-time faculty, has an active postgraduate and graduate studies program and a record of accomplishments in research, teaching and service.

We are searching for an outstanding internationally recognized academic leader with a PhD, MD or equivalent degree, a strong academic background with demonstrated research and educational achievements in microbiology & infectious diseases, as well as demonstrated scientific leadership and administrative ability. Eligibility for licensure in the Province of Alberta is also required if the selected individual will be providing patient care.

Applications and nominations, including a curriculum vitae, a statement of research interests, administrative philosophy, academic goals and the names of three referees should be forwarded by **June 30, 2001** to:

D. Grant Gall, MD, FRCPC
Dean, Faculty of Medicine
3330 Hospital Drive N.W.
Calgary, Alberta Canada T2N 4N1

In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. The University of Calgary respects, appreciates and encourages diversity.

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The pharmaceutical market is rapidly changing; evolving and maturing everyday as new ways and tools are being developed to improve the quality of human life. Ideas, outstanding performance and the growth and caring of our people are at the core of our value system. Our future is in the hands of the individuals who make up our company.

Staff Scientist - Metabolic Diseases

The Metabolic Diseases Department has an opening for a staff scientist position. Candidates with a B. S./M. S. in biochemistry/molecular biology and at least 5 years of research experience are encouraged to apply. Experience in a wide range of molecular biology and tissue culture techniques is required. The scientist will engage in target validation studies and establish various assays in support of drug discovery programs.

Our commitment to our employees includes an excellent salary and a comprehensive benefits package. To apply, please forward your cover letter and resume to: **DuPont Pharmaceutical Company, Attn. Human Resources - 11170, Experimental Station, E400/2413, Route 141 & Henry Clay Rd., Wilmington, DE 19880; E-mail: AMSresume@dupontpharma.com.** An Equal Opportunity Employer.



DuPont Pharmaceuticals Company



Dean UNIVERSITY OF DELAWARE College of Agriculture and Natural Resources

The University of Delaware invites applications and nominations for the position of Dean of the College of Agriculture and Natural Resources. A major state-assisted research institution with a total enrollment of about 20,000 students, the University has been on an accelerated climb to national and international prominence.

The College of Agriculture and Natural Resources offers 17 undergraduate majors and 13 graduate degree programs in the departments of Animal and Food Sciences, Bioresources Engineering, Entomology and Applied Ecology, Food and Resource Economics, and Plant and Soil Sciences. Research activities span a wide range across those departments and current research expenditures total about \$12.5M per annum. The Delaware Biotechnology Institute has been formed with several named professors and major research activities, some of which are in the College.

The Dean provides leadership for the College's 70 faculty and approximately 140 graduate and 700 undergraduate students. Along with the six other deans, the Dean of Agriculture and Natural Resources reports directly to the Provost and is a crucial component of the central management team, including active participation in University development activities. The Dean is responsible for overall faculty and program development and general financial management of the College. S/he is charged with providing the vision and strategic planning necessary to develop and enhance the quality of the College's undergraduate, graduate and research programs, and to facilitate collaborations with other colleges and industrial, governmental, and philanthropic organizations. The Dean is also Director of the Agricultural Experiment Station and the Dean or his/her designate will be the

Director of the Delaware Cooperative Extension System. The Cooperative Extension System, with 45 professionals, delivers research-based information and technology in many disciplines to youth and adults throughout Delaware.

The candidate must meet the requirements for appointment to the rank of professor in one of the departments in the College. In addition, the successful candidate must have experience in attracting and managing sponsored research and demonstrate an appreciation for the administrative support needed to maintain a vigorous research, teaching and extension program. Qualifications include an earned doctoral degree, a distinguished scholarly record, significant administrative experience and the ability to lead the College in its academic responsibilities.

Applications should include a letter of interest, curriculum vitae, and names of three references. Nominations and applications will be accepted until the position is filled. Nominations and expressions of interest will be held in confidence. Candidates should submit materials to **Dean Eric Kaler, Chair, Agriculture and Natural Resources Dean Search Committee, 200 Academy Street, University of Delaware, Newark, DE 19716.** More information regarding this search and the College of Agriculture and Natural Resources is available at <http://ag.udel.edu>.

The University of Delaware is committed to the importance of interdisciplinary, multicultural, gender, and equal opportunity concerns and to the principles and goals of Affirmative Action. The UNIVERSITY OF DELAWARE is an Equal Opportunity Employer that encourages applications from Minority Group Members and Women.



ILLINOIS

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UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Director

A New Institute for Post-Genomic Science and Technology

The University of Illinois at Urbana-Champaign invites applications and nominations for the position of Founding Director of a new institute dedicated to research in post-genomic science and technology. The Director will be influential in creating and charting the focus of this Institute, which will provide an interdisciplinary research environment in which genomic information can best be exploited to drive fundamental advances in the biological sciences. We are seeking a strong leader with an exceptional record of scholarly accomplishment, who will build on established excellence in the biological and physical sciences, engineering and agriculture, and who will enhance our strong campus tradition of interdisciplinary interactions. The Director should have the vision and ability to couple first class academic research with appropriate goals both in education and economic development, and have the ability to promote partnerships with the public and private sectors. This Initiative involves the hiring of up to 40 new faculty. The Institute will occupy a 110,000 sq ft facility to be constructed beginning in 2001.

The University of Illinois already is home to a number of large-scale multidisciplinary centers, institutes and programs, including the Beckman Institute for Advanced Science and Technology, the Biotechnology Center, the W.M. Keck Center for Comparative and Functional Genomics, and the National Center for Supercomputing Applications. For more information, see <http://www.uiuc.edu/unit/vcrs/pginfo.htm>

The Institute Director will be charged with the overall leadership of the Institute. This will include establishing areas of research focus and leading efforts to hire faculty positions associated with the Institute, by working with existing campus units, managing the Institute's physical and financial assets, assisting the Institute's faculty in acquiring external support for research, and representing the Institute beyond the Campus. The Director will possess the standing of an academic dean on the Urbana-Champaign campus.

The Director will hold a doctoral degree in one the disciplines represented in the Institute, will have achieved the rank of Professor in a leading research institution, and will have an outstanding record of scientific accomplishments; experience in academic administration is desirable.

To be assured of full consideration, nominations and applications (including a *curriculum vitae*) should be postmarked by July 15, 2001. This full time (twelve month) position is available as soon as a suitable candidate can be identified. The salary is competitive and negotiable. Please send applications to:

Professor Tony Waldrop
Vice Chancellor for Research
Chair, Search Committee
Office of the Vice Chancellor for Research
University of Illinois at Urbana-Champaign
Swanlund Administration Building, Room 420
601 East John Street
Champaign, IL 61820
Attn: Melanie Loots, 217/333-0034; 217/244-3716 (fax)

The University of Illinois is an Affirmative Action, Equal Opportunity Employer



MAX-PLANCK-GESellschaft

Max-Planck-Institut für Molekulare Genetik Berlin

The Max Planck Institute of Molecular Genetics in Berlin, Germany, invites applications for the following positions:

3 POST-DOCTORAL FELLOWS (BAT I b and II a) and TECHNICAL ASSISTANT (BAT IV a)

2 post-doctoral positions and a technical position in the Protein Technologies group (Dr. Cahill) and 1 post-doctoral position in the Gene Trap group (Dr. Ruiz), Department Lehrach.

These post-doctoral positions are based on a joint project between our 2 groups, entitled „Gene expression profile analysis on normal and dilated human cardiomyopathy tissues“ where funding has already been obtained from the German Human Genome Project.

Dr. Cahill's group has a strong focus on large-scale and high-throughput protein technologies, such as the generation of high density protein arrays, high throughput expression from cDNA libraries and proteome analysis (<http://www.molgen.mpg.de/~proteingroup/DHGPCardioProtein.html>). These two post-doctoral positions require a strong background in molecular biology, an interest in high throughput technology, and preferably also in some of the following areas: cDNA library production, protein expression in *E. coli* and yeast, phage display, BIAcore analysis, mass spectrometry. The technical assistant position should have some experience in molecular biology and protein expression.

Dr. Ruiz's group focuses on the high-throughput functional analysis of genes using DNA chip technology as well as mouse mutants. Candidates for this position should have a strong background in molecular biology. The areas of research will cover the use of novel conditional gene trap vectors, 5' RACE and phenotyping of mouse mutants.

The positions are available immediately. Post-doctoral positions are available for two years, with a possibility of extension.

For further information and inquiries contact:

Dr. Dolores Cahill; Tel. +49 172 6610084; e-mail: cahill@molgen.mpg.de or Dr. Patricia Ruiz; Tel. +49 30 8413 1228; e-mail: ruiz@molgen.mpg.de

Applications in English with covering letter, curriculum vitae, bibliography, summary of past research, and details of two referees should be sent to:

Max-Planck-Institut für Molekulare Genetik
Personalabteilung
Ilhnestrasse 73, D-14195 Berlin, Germany

Program Coordinator Defense Brain and Spinal Cord Injury Program

The Defense Brain and Spinal Cord Injury Program (DBSCIP) is a collaborative program designed to address head and spinal cord injury in the military and civilian communities. Collaborative organizations include the Uniformed Services University of the Health Sciences (USUHS), the Henry M. Jackson Foundation for the Advancement of Military Medicine, selected Veterans Administration hospitals, several military medical treatment facilities and a number of community support groups and networks.

The incumbent will be responsible for providing programmatic and administrative oversight to DBSCIP efforts to assure high quality management and to maximize the effective use of project resources. Historically, the total annual funding from the Department of Defense is in the range of \$7 million to \$10 million.

The incumbent must bring to this position a minimum of the Doctor of Medicine or Doctor of Philosophy degree in a biomedical field and substantial experience in the management of programs of a similar size. This individual must have demonstrated leadership abilities as well as the ability to develop consensus decisions. A knowledge of brain injury and spinal cord injury is highly desirable.

The position is located in the Henry M. Jackson Foundation for the Advancement of Military Medicine, a not-for-profit organization chartered by Congress in 1983 to support military medical research and education and to promote public-private partnerships. The Foundation provides comprehensive management and scientific services to support programs at USUHS and more than 75 military research institutes and treatment facilities across the country.

Applicants should submit a curriculum vitae and the names and addresses of three individuals who may be contacted for letters of reference to:

Joseph V. Osterman, Ph.D.
Vice President for Scientific Affairs
Henry M. Jackson Foundation for the Advancement of Military Medicine
1401 Rockville Pike
Rockville, MD 20852
E-mail - josterman@hjf.org
Institution websites - Henry M. Jackson Foundation www.hjf.org
-Uniformed Services University www.usuhs.mil

The Henry M. Jackson Foundation for the Advancement of Military Medicine is an Affirmative Action/Equal Opportunity Employer

OCEANIC INSTITUTE VACANCIES

The Oceanic Institute, a not for profit aquaculture organization founded in 1960 and principally located in Waimanalo, Hawaii is seeking professional scientists/researchers to fill the following positions:

VICE PRESIDENT FOR RESEARCH

The Oceanic Institute is seeking an experienced professional to lead, manage, and grow its multi-million dollar research programs in advanced aquaculture, coastal fisheries, and biotechnology. Directs and professionally develops a staff of 100 including 30 Ph.D. researchers with diverse specialties which support research in marine sciences, aquaculture, and biotechnology. Integrates these multiple research efforts into a cohesive, scientifically rigorous and responsive program supporting the corporate goals of the Institute.

The Vice President serves as the principal scientific spokesperson for and represents the Oceanic Institute in local, national and international forums. The vice president provides contacts, concepts, visions, strategies, plans, and technical support for essential ongoing and future business development activities in the private, government and commercial sectors both nationally and internationally.

The position requires an earned Ph.D. in a relevant scientific discipline with a minimum of 15 years experience; a reputation as a leader in directing and managing basic and applied research; an in-depth knowledge and credibility in aquatic biotechnology and/or aquaculture; a proven leader in developing integrated scientific teams and effective in attracting new staff and in expanding the research funding base through innovative proposals, partnerships and competitive grants.

Position available immediately.

DIRECTOR OR PROGRAM MANAGER: MARINE ANIMAL FEED & NUTRITION PROGRAM

The Oceanic Institute is seeking an experienced research manager to lead its marine animal feed and nutrition program. Manages all research and administrative aspects of a growing program currently at \$2 million/year with a professional and technical staff of 18 (including 5 research scientists) and extensive research and operational facilities spread over two geographically separate sites. Responsible for research design, execution, evaluation, proposal development, reports, publications, and coordination with other on-site programs. Interacts with funding agencies (both government and private sector) to support current programs and develop new initiatives. Supports and develops the professional and technical staff.

Requires a Master's or Ph.D. in a relevant scientific discipline with minimum of five to ten years' experience; proven leader in directing/managing basic and applied research, in developing integrated scientific teams and in expanding research programs through innovative proposals, partnerships, corporate contracts and competitive grants. Experience in managing or providing oversight and direction to a research feeds mill is desirable. Must have in-depth knowledge and credibility in aquatic biotechnology and/or aquaculture.

Position is available immediately.

FISH BY-PRODUCTS PROCESSING TECHNOLOGIST

The Oceanic Institute is seeking an experienced scientist capable of planning, developing, coordinating and implementing research on the development of improved environmentally sound processing methods for the production of fishery by-product meals, oils, and other recoverable nutrients. The aim of this research is to improve resource utilization within the fisheries sector by producing cost-effective high-quality feedstuffs and supplements for use in aquatic and terrestrial animal feeds.

Requires a Master's or Ph.D. level or higher in fish/food processing technology, with proven research and/or field experience concerning fish processing technology. Commercial overseas experience in the seafood industry is also desirable. The position will be based in Hawaii with prolonged assignments in Alaska (Kodiak), with an option to base in Alaska with prolonged assignments in Hawaii. Position will require travel and may require substantial outdoor work, exposure to sunlight and harsh climates, working with processing machinery, chemicals, temporary off-site work and flexible hours.

Position is available immediately.

For all positions announced, send resume and curriculum vitae, including at least three references to:

**The Oceanic Institute
Attention: Human Resources
41-202 Kalaniana'ole Highway
Waimanalo, HI 96795 U.S.A.**

Additional information about the Oceanic Institute can be found at www.oceanicinstitute.org. Specific questions may be forwarded to csiu@oceanicinstitute.org or faxed to 808-259-5971. Full benefits program. Salary for each position is consistent with qualifications. All non-US applicants must have a valid passport and be eligible for a working visa.



DEUTSCHES KREBSFORSCHUNGSZENTRUM
Stiftung des öffentlichen Rechts

German Cancer Research Center
Research Program Radiological Diagnostic and Therapy
Department of Biophysics and Medical Radiation Physics (E 0200)
Head: Prof. Dr. Dr. Wolfhard Semmler

The Department of Biophysics and Medical Radiation Physics is looking for an outstanding

Scientist in PET-Physics (No. 65/2001)

Areas of our particular interest are correction algorithms and image reconstruction as well as the development and application of pharmacokinetic models.

She/he will be charged with the reorganization and supervision of the Positron Emission Tomography work group of the department of Biophysics and Medical Radiation Physics at the German Cancer Research Center.

Applicants should have a strong background in Positron Emission Tomography and Magnetic Resonance Imaging as well and should be able to direct an interdisciplinary team of physicists and computer scientists. Close cooperation with medical personnel and radiochemists is mandatory. She/he is encouraged to initiate and perform her/his own research projects.

The successful applicant will find an excellent space and state-of-the-art core facilities including a whole-body PET scanner, a cyclotron and three modern MR-Imagers. The Department of Radiochemistry supports the research by production and development of new radiopharmaceuticals.

Applicants should have a Ph.D., preferably both Ph.D. and M.D. degrees as well as several years of relevant postdoctoral experience and an excellent publication list with high rank publications.

For more information please contact:
Prof. Dr. Dr. Wolfhard Semmler
Tel: 0049 6221 42 2550, Fax: 0049 6221 42 2613
e-mail: wolfhard.semmler@dkfz-heidelberg.de

Your CV, description of research interests, publication list, and the names of three references should reach us no later than May 30, 2001 at the

**German Cancer Research Center
Human Resources – V 0300
Im Neuenheimer Feld 280
69120 Heidelberg
GERMANY**

SRI International is in the business of innovation.
We're celebrating our 55th year as the **world's premier non-profit R&D** institute, where advances in medicine, science, biotechnology, and computing are daily occurrences.

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Director, Medical Diagnostics Center

The Director will lead SRI's Center of Excellence for Advanced Medical Diagnostics. Reporting to the VP of Physical Sciences, the Director will work closely with researchers experienced in rapid assessment diagnostics, optics, noninvasive monitoring, microfluidics, enhanced signal processing, robotics, life sciences, and other disciplines at SRI.

Qualifications:

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- Work with government-sponsored R&D and proven ability to secure federal funding
- Ability to recognize needs and trends for new medical diagnostics
- Ability to direct and grow a scientific unit
- "Name recognition" at NIH
- Education: preferably an M.D. with a degree in Chemistry, Physics and/or Engineering

The Center for Excellence will also help develop new, licenseable technologies that can be spun off as new, for-profit medical diagnostic start-ups. Among other great benefits, inventor/developer royalties and equity are available.

Contact Information: Employment & Diversity Department

SRI International

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By email: search@sri.com By fax: (650) 859-4222
www.sri.com



Informatics

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For information, contact Daryl Anderson

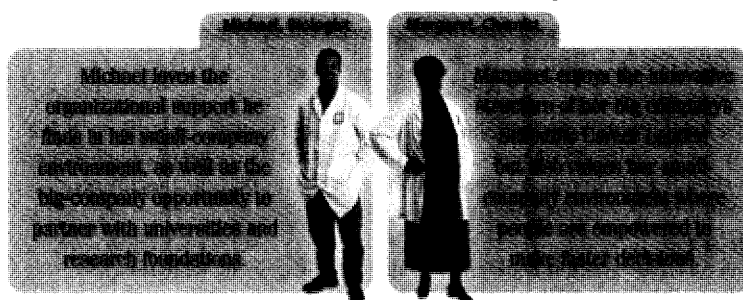
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THE R.W. JOHNSON
PHARMACEUTICAL RESEARCH INSTITUTE

The R.W. Johnson Pharmaceutical Research Institute, located in Spring House, Pennsylvania, conducts pharmaceutical research in therapeutic areas including anti-infectives, central nervous system, dermatology and oncology.

Group Leader—Drug Discovery

(Req code: 0115705CI)

In this challenging role, you will direct a research team in both in vitro and in vivo laboratories to discover therapeutics for neurological and psychiatric disorders and interact closely with medical chemists.

To qualify, you must have a Ph.D in pharmacology, neuroscience (or a related field) or M.D., Ph.D and 7+ years of experience in an industrial drug discovery setting with a substantial record of accomplishment. Exceptional leadership and multi-tasking skills are essential.

Visit www.jnj.com/careers to explore Johnson & Johnson and to establish a profile with our *Career Finder* system. Please reference company and requisition code with all specific applications. Hard copy resumes can be mailed to Johnson & Johnson Recruiting, P.O. Box 16597, New Brunswick, NJ 08906-6597.



Tenure-Track Positions National Institutes of Health (NIH) National Institute of Child Health and Human Development (NICHD)

The newly created Laboratory of Cellular and Synaptic Neurophysiology (LCSN), NICHD, NIH is offering two tenure-track investigator positions to develop independent research programs. We seek outstanding applicants specifically interested in receptor targeting and trafficking, *in vivo* or *in vitro* synaptic physiology and plasticity. The successful candidates will have established strong research credentials with a substantial record of quality publications. A tenure-track investigator will be supported for up to six years before tenure is required.

Candidates should send a two-page statement of research interests and goals, CV, bibliography and three letters of recommendation by June 30, 2001 to:

Dr. Charles Gerfen
Chairman, LCSN Search Committee
Laboratory of Systems Neuroscience
Bldg 36, 2D30
36 Convent Drive MSC 4075
Bethesda, MD 20892-4075

The NIH is an Equal Opportunity Employer



DIRECTOR OF BIOINFORMATICS CORE

The Office of the Vice President for Research at the University of Michigan is seeking applicants for the position of Director of the Michigan Center for Biological Information (MCBI). The MCBI is an integral component of a State of Michigan-

supported research and development initiative, the Core Technologies Alliance, which will provide new and enhanced cutting-edge technologies to life scientists in the State of Michigan. In addition to the MCBI, the Core Technologies Alliance, led by the University of Michigan, Michigan State University, Wayne State University, and the Van Andel Research Institute, includes four other cores focused on genomics (Michigan Center for Genomic Technologies), proteomics (Michigan Proteomics Consortium), structural biology (Michigan Center for Structural Biology), and animal models (Michigan Animal Models Consortium).

The MCBI, with a hub at the University of Michigan in Ann Arbor, and satellites at the other three institutions, will provide bioinformatics expertise, data storage, and analytical software in support of the four biotechnology cores as well as corporate clients throughout the State. Specific tasks to be supported by the MCBI include the measurement of molecular components, the management of databases, performance of automated sequence analysis, and the formulation of molecular models.

The director, to be based at the University of Michigan in Ann Arbor, will oversee a staff of bioinformatics specialists at the four collaborating institutions. The director will be a candidate for a full-time University of Michigan faculty appointment (instructional or research track, level based upon academic experience) in a relevant academic department. Candidates for this position should have a Ph.D. in a discipline relevant to bioinformatics/computational biology and expertise in applying computational technology to functional genomics.

Applicants should submit their curriculum vitae, a one-to-two page statement of their major academic interests, and three letters of recommendation to:

Dr. Robert F. Todd, III; Associate Vice President for Research, Health Affairs; Office of the Vice President for Research; University of Michigan; 4080 Fleming Building; 503 Thompson Street; Ann Arbor, MI 48109-1340.

The University of Michigan is an Equal Employment Opportunity/Affirmative Action Employer and strongly encourages applications from underrepresented groups including women and minorities.



EXCEED YOUR EXPECTATIONS

GMP Vector Production Facility

Mayo Clinic is an affirmative action and equal opportunity employer.

Mayo Clinic in Rochester, MN has established a **Molecular Medicine Program** with several groups working on gene therapy using different viral systems. Production personnel are sought to operate a new, academic GMP Vector Production Facility established to support preclinical and phase I clinical gene therapy studies. A range of different viral gene therapy vectors will be produced and purified in the facility. We currently have the following positions available:

• **Production Manager – job posting #01-1721.SCI**

Must have experience in GMP production, molecular biology, tissue culture and laboratory management. Requires a Master's degree in biology, chemistry, or relevant sciences with extensive experience in research project design and development or a Ph.D. Previous experience in the production and purification of viruses is highly desirable.

• **Senior Research Technician – job posting #00-3132.SCI**

Experience in virology, molecular biology, tissue culture and laboratory management is required. Bachelor's degree in a biological science required; Master's degree preferred. Five years directly related experience in two or more of the following areas: generation and use of viral gene transfer vectors, GMP production of biologics, quality control of biologics, documentation systems/controls, process development for large scale tissue and virus culture, and process development for large scale purification of biologics.

For additional information on these Mayo Clinic opportunities, visit our web site: www.mayo.edu.

Mayo Clinic offers an excellent salary and benefits package including relocation assistance. **To apply, send current curriculum vitae and bibliography, a summary of past accomplishments, and three references to:**

Mayo Clinic, Human Resources Ozmun East
200 1st Street SW | Rochester, MN 55905

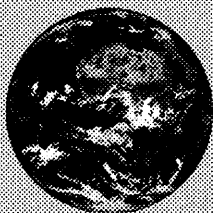
Mayo Clinic uses optical scanning technology. Please use a 12 point font in your resume with minimal use of bullets, italics, underlining and bolding.

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**Research
Analyst**
Skin Bioscience

UNILEVER is the leading consumer products company in the world with sales of \$44 billion. Our success is built upon collaborative scientific research and product development efforts resulting in a portfolio of nationally and internationally known brands including Dove, Lever 2000, Wisk, "all", Vaseline, Pond's, Thermasilk, Suave, Calvin Klein Cosmetics, Lipton, Ben & Jerry's, and Breyer's Ice Cream. This position is based at our global research facility in Edgewater, NJ, located on the Hudson River within 20 minutes of Manhattan's diverse academic, entertainment and cultural resources.

Research Analyst Skin Bioscience

This position, within our Skin Bioscience unit, will have responsibility for the analysis of clinical samples for biomarkers that predict skin benefits of experimental new technologies. You will be involved in developing new analytical techniques to evaluate clinical samples in order to assess efficacy of new technologies. You will also coordinate activities of Bioanalytical group with Clinical Evaluation and individual project teams to develop sampling techniques and clinical protocols that maximize efficiency, sample quality, and timely delivery of clinical results.

The ideal candidate will have a MS or PhD in Analytical Chemistry or related discipline, along with

3-5 years related laboratory experience, utilizing a variety of analytical techniques. The position demands a high level of creative problem solving, oral and written communication skills and leadership abilities.

We offer a competitive salary, flexible benefits including tuition assistance, and a dynamic environment filled with learning and discovery beyond conventional scientific boundaries. For consideration please forward your resume to: Human Resources Dept. RASB-S, Unilever Research US, 45 River Road, Edgewater, NJ 07020 or E-Mail: job.mca@unilever.com Please place only the letters RASB-S as the subject of the e-mail. We appreciate your interest in our company and will contact applicants who most closely meet our immediate requirements. Applicants must be authorized to work in the USA. Unilever is an Equal Opportunity Employer m/f/d/v.



Unilever

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For more information about Unilever Research and Unilever visit our Internet Web Site at <http://www.unilever.com>



The Department of Biological Sciences at the University of Idaho will hire five academic-year tenure-track faculty positions beginning January 2002. The department is seeking broadly trained cellular and organismal biologists to complement existing expertise in the areas of ecology and evolution, fish reproductive biology, neurobiology and aging research. Individuals with the following expertise are especially encouraged to apply:

Plant biologists with knowledge of plant natural history and diversity to develop, extend, and empirically test theory in plant community ecology, plant-animal interactions, or plant systematics.

Neurobiologists whose research focuses on neurodevelopment, neuroendocrinology, or the neurobiology of aging.

Fish reproductive biologists with expertise in the use of molecular genetics to conduct research on the endocrinology of reproduction, or conservation biology through the use of comparative genomics.

Successful candidates for all positions should have a Ph.D. in a biology subdiscipline, postdoctoral experience with a strong publication record, the potential to establish a nationally competitive, externally funded research program, and be willing to participate in interdisciplinary, collaborative research. A strong commitment to both graduate and undergraduate teaching is essential. Applicants should send their curriculum vitae, a letter outlining research and teaching interests and philosophy, copies of four significant publications, and three letters of reference to: **Dr. Larry Forney, Department of Biological Sciences, University of Idaho, Moscow, ID 83844-3051.** The review of applications will begin as soon as sufficient suitable candidates have been identified but not before July 1, 2001. This is a continuous recruitment process to fill several openings. More information about the Department and these positions can be found at website: <http://www.uidaho.edu/LS/BioSci/>. Applications from women and minorities are particularly welcome. The University of Idaho is an Affirmative Action/Equal Opportunity Employer.



FACULTY POSITIONS IN HIV/AIDS

The Center for AIDS Research and the Department of Medicine at Case Western Reserve University are recruiting HIV virologists. These faculty positions can be at any level. Qualified applicants will have a relevant graduate degree (Ph.D. and/or M.D.), a track record of research productivity and the potential to initiate and maintain a vigorous research program.

A major focus of the CWRU Center for AIDS Research is on viral and immune pathogenesis of AIDS. We also have a strong presence in international AIDS and infectious diseases research. Please send a curriculum vitae along with the names of three references and a one page summary of a proposed research plan to: **Chair, Virologist Search Committee; Case Western Reserve University; Center for AIDS Research; Biomedical Research Building; 10900 Euclid Ave.; Cleveland, OH 44106-4984 or e-mail lgj@po.cwru.edu.**

Case Western Reserve University is an equal opportunity employer.



CASE WESTERN RESERVE UNIVERSITY



Graduate Program

University of Geneva and other participating Swiss Institutions

This is a new international program for doctoral training, established through the Frontiers in Genetics program and supported by the Swiss National Science Foundation. The program is based at the University of Geneva but includes participating members at the Universities of Lausanne and Zurich and at the Swiss Institute for Experimental Cancer Research, Lausanne. The program will accept students towards a Ph.D. degree starting October 2001 and will provide a strong grounding in molecular genetic, genomic and proteomic approaches to the study of modern biological problems.

We are seeking outstanding candidates with a degree in the Life Sciences and a commitment to a career in research. The students selected will receive stipends for four years, subject to completion of all the program requirements.

Applicants should send a letter describing their interests, background and research experience, if any, an official transcript of their university curriculum with grades, and contact information of two persons who can supply letters of recommendation to this address:

**Frontiers in Genetics Doctoral Program, Department of Zoology and Animal Biology, 30 quai Ernest Ansermet, CH-1211 Geneva, Switzerland
front-genetics@zoo.unige.ch**

The application deadline is June 15, 2001 for admission in October 2001.

Participating Faculty and research interests:

Denis Duboule, University of Geneva, Mouse developmental and molecular genetics

Stylianos E Antonarakis, University of Geneva, Molecular basis of human genetic disorders including aneuploidies

Konrad Basler, University of Zurich, Cell communication and signal transduction in embryonic development

Stuart Clarkson, University of Geneva, DNA repair deficiencies in human genetic disorders

Susan Gasser, University of Geneva, Chromatin 3-D organization and nuclear function

Ernst Hafen, University of Zurich, Cell signaling and growth control in *Drosophila*

Uli Laemmli, University of Geneva, Chromosome structure and function

Joachim Lingner, ISREC Lausanne, Telomerase and chromosome end replication

Vincenzo Pirrotta, University of Geneva, Polycomb complexes and chromatin silencing

Ueli Schibler, University of Geneva, Molecular analysis of the mammalian circadian timing system

David Shore, University of Geneva, Chromatin structure and gene regulation; telomere replication and function

Pierre Spierer, University of Geneva, Epigenetic and genetic control in *Drosophila* development

Didier Trono, University of Geneva, Gene remodeling by exogenous elements: clues and uses of retroviral geneactivation

Jean-Dominique Vassalli, University of Geneva, Mammalian embryogenesis: germ line and endocrine pancreas differentiation

Walter Wahli, University of Lausanne, Genetics of energy homeostasis in mammals

Department Chairman - Genetics



Case Western Reserve University School of Medicine seeks an accomplished scientist to serve as Chair of its Department of Genetics.

Current faculty in the Department of Genetics represent a broad range of interests in fundamental biological problems and human disease, with particular strengths in human genetics, mouse models of human disease, and *Drosophila* and mouse developmental genetics. The department sponsors Graduate Programs leading to the Ph.D. or combined M.D./Ph.D. degrees, as well as an affiliated Program in Genetic Counseling leading to an M.Sc. degree.

Applicants for this leadership position should hold a Ph.D., M.D., or equivalent terminal degree. Preference will be given to an individual with an outstanding record of academic accomplishments in any field of Genetics, including human, vertebrate or invertebrate model organisms. This individual will develop and implement a long-term strategy for further development of the Department of Genetics and recruit new faculty in broad areas of genetics, including genomics and bioinformatics.

The CWRU Department of Genetics currently ranks eighth in NIH funding among Genetics departments. CWRU and its affiliated hospitals comprise the largest biomedical complex in Ohio.

Please send letters of interest with curriculum vitae to: Search Committee for Genetics Chair, Room W-427, Case Western Reserve University School of Medicine, 10900 Euclid Avenue, Cleveland, OH 44106-4935. Applications and CVs may be sent by email to genetics_search@biochemistry.cwr.edu

Case Western Reserve University is an Affirmative Action/Equal Opportunity Employer. Qualified women and minority group members are encouraged to apply.

**CASE WESTERN RESERVE
UNIVERSITY**

LSU

POSTDOCTORAL POSITIONS

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
Louisiana State University Health Sciences Center- Shreveport

Louisiana State University Health Sciences Center- Shreveport is a biomedical research institution that has state-of-the-art facilities for basic and clinical research and provides a positive training environment for scientific endeavors and career development. Postdoctoral positions are available to study the following areas of extramurally funded research:

Mechanism and Regulation of Eukaryotic Protein Synthesis. A position is available for research in eukaryotic protein synthesis and its relationship to cell growth and oncogenesis. Current topics under investigation include initiation factor interactions, eIF4E isoforms in *C. elegans*, initiation factor phosphorylation, regulation of initiation factor expression, mechanism and regulation of internal initiation of translation, and relation of eIF4E to tumorigenesis. **Reply to Dr. Robert Rhoads, Professor and Head.**

Yeast Genetics and Cell Biology. A position is available for research on protein phosphatase I (PP1), a highly conserved ser/thr-specific phosphatase in eukaryotes. Our laboratory uses genetic, biochemical and cell biological approaches in yeast to investigate the physiological and cell cycle roles of PP1, determine the substrates involved in these processes, and identify targeting subunits that provide substrate specificity for the phosphatase. **Reply to Dr. Kelly Tatchell, Professor.**

Cellular Protein Trafficking. A position is available to study an adapter protein that binds to an actin based motor protein and to the C-termini of diverse proteins including the glucose transporter GLUT1 and others involved in the regulation of cell adhesion and motility. Individuals with experience in molecular biology, biochemistry, and/or protein trafficking are encouraged to apply. **Reply to Dr. Brent Reed, Associate Professor.**

Physical Biochemistry of Molecular Chaperones. A position is available for research on characterizing the interactions between DnaK and DnaJ, which are two molecular chaperones expressed by *E. coli*. The goal of this research is to determine the mechanism by which DnaJ promotes substrate binding to the ATP-bound state of DnaK. Individuals with experience in biochemical kinetics and/or molecular biology are encouraged to apply. **Reply to Dr. Steve Witt, Associate Professor.**

Successful candidates should have a recent Ph.D. in biochemistry or a related discipline or an M.D. Please send curriculum vitae and the names and phone numbers of three references to: **Annella B. Nelson, Business Manager, Department of Biochemistry and Molecular Biology, LSU Health Science Center, 1501 Kings Highway, Shreveport, LA 71130-3932** For more information, please visit our website at <http://gradsch.shreveport.lsumc.edu>. LSUHSC is an Equal Opportunity Employer.

JUVENIR BIOSCIENCES INC.

JUVENIR BIOSCIENCES, INC., a new biotech start-up company, dedicated to the discovery of mechanism-based drugs and active cosmetics for hair and skin conditions, is searching for scientists at the M.S. and Ph.D. (in Biosciences) levels to join us in our drug discovery/development thrust. We are seeking entrepreneurial spirited scientists who will thrive in the fast-moving, team driven atmosphere of such start-ups and who have strong molecular biology, genetics, genomics, and developmental biology backgrounds. Experience of five years in biopharmaceutical research is preferred. Demonstrated productivity and strong publication record are sought. All positions include a benefits package as well as equity in the company. We are located in the Princeton, New Jersey area. Interested scientists should send a curriculum vitae to:

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199 Grandview Road
Skillman, New Jersey 08558-9418
Kstenn@cpcus.nj.com

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ALBERT EINSTEIN COMPREHENSIVE CANCER CENTER POSTDOCTORAL OPPORTUNITIES

Applicants are invited to apply for postdoctoral positions within the laboratories of investigators engaged in interdisciplinary, collaborative research programs that range from basic molecular genetics to disease-focused activities. There is a strong infrastructure in support of basic research that includes core laboratory facilities in mouse genetics, histopathology, imaging, DNA microarray, proteomics, structural biology (synchrotron beam at Brookhaven National Laboratory, x-ray crystallography, NMR), FACS, etc. Opportunities are available in the following areas:

- Functional roles of transcription repressor BCL-6 in regulating normal responses and neoplastic transformation of germinal center B cells-**Hilda Ye**
- Macrophages in mammary gland development and cancer-**Jeffrey Pollard**
- Proteomic and genomic analysis of the roles of EGF receptor family signaling in breast cancer metastasis-**Jeffrey Segall**
- The detection of cancer-related gene expression in single cells and tissues using high-throughput FISH-**Robert Singer**
- Reprogramming tumor cells to terminal differentiation; role of H1 linker histones in mammalian development-**Arthur Skoultschi**
- Transcriptional repression and tumor suppression: mouse models of prostate cancer-**Nicole Schreiber Agus**
- Human papillomaviruses E2 proteins and their cooperative assembly with other replication and transcription factors-**Michael Brenowitz**
- Regulation of embryonic hematopoiesis by BMP signaling and GATA transcription factors, including transgenic zebrafish models-**Todd Evans**
- Identifying new functions for glycans and glycosyltransferases such as fringe in development, cancer and Notch signal transduction-**Pamela Stanley**
- Chemical genetics, interactive proteomics and signaling molecules-**Zhong-Yin Zhang**
- Identification of prostate cancer susceptibility genes using linkage-disequilibrium-**Robert Burk**
- Relationship between diet and cancer in an ongoing cohort study-molecular epidemiological applications-**Thomas Rohan**
- Structural genomics and biophysical studies of protein interactions in cancer-**Mark Chance**
- New approaches to the computerized definition of transcription control of the neoplastic phenotype-**Joseph Locker**
- Targeting DNA repair molecules to enhance cytotoxicity of DNA damaging agents-**David Bregman**
- Functional genomics in tumor cell resistance to antineoplastics-**I. David Goldman**



**ALBERT EINSTEIN
COLLEGE OF MEDICINE**
Advancing science, building careers

Applicants should send curriculum vitae, letters of reference, and a description of research interest to: **Kathleen E. Pickering, Associate Director for Administration, Comprehensive Cancer Center, Albert Einstein College of Medicine, Jack & Pearl Resnick Campus, 1300 Morris Park Ave, Bronx, NY 10461; FAX: (718)430-8550; Email: aeccc@aeom.yu.edu** EOE



Vice President for Research and Dean of Graduate Studies

Kent State University seeks a VICE PRESIDENT FOR RESEARCH AND DEAN OF GRADUATE STUDIES. Reporting to the Provost, the successful candidate will enhance the University's research environment, promote scholarly activity, represent the University to government agencies, private foundations and corporations, and facilitate and amplify extramural funding and university outreach. As dean of graduate studies, the successful candidate will oversee graduate programs and, along with the deans of the academic colleges, manage resource allocations including graduate assistantships.

KENT STATE UNIVERSITY is an eight-campus public institution that enrolls 32,000 students, (22,000 at its Kent campus). It administers 21 doctoral programs with a graduate enrollment of approximately 4500 and is designated a Doctoral/Research-Extensive university by the Carnegie Foundation. Kent State is the lead public research university in Northeast Ohio, and offers many nationally renowned programs of postgraduate study in architecture, biomedical sciences, business administration, education, nursing, library and information science, technology, music, and fine arts. The university also conducts a variety of interdisciplinary programs, operates a university press, and houses major research facilities including its Liquid Crystal Institute.

The successful candidate must have an earned doctorate, academic achievement sufficient for appointment as Professor in a Kent State department, a record of successful procurement or administration of major extramural funding, previous experience in administering research and graduate programs at a doctoral research university or equivalent institution, and familiarity with current trends affecting graduate study. Salary is competitive. This position will be available on or before September 1, 2001. For more information on this position, please visit our website at: http://kent.edu/ksuProvost_Office/who/vpsearch. The Search committee will review applications as received until the position is filled. Dossiers completed by June 1, 2001, are assured of full consideration. Nominations or letters of application by candidates, accompanied by a vita and the names and contact information of five professional references, should be submitted to: **Professor C. Owen Lovejoy, Chair, Vice President-Research Search Committee, Office of the Provost, Suite A, Executive Offices, Kent State University, Kent, Ohio 44242-0001.**

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POSITIONS OPEN

UNIVERSITY OF RHODE ISLAND

The Biological Sciences Department anticipates two one-year, non-tenure-track **LECTURER** positions for the academic year 2001–2002 pending approval of the searches and state funding. Renewal contingent on job performance and funding.

Lecturer in biology (Log Number SM 021420): Duties include but may not be limited to teaching undergraduate courses in nonmajors animal biology, invertebrate zoology, human anatomy, and human physiology. Ph.D. in biology or related discipline required. Preference will be given to candidates with college-level experience in teaching some or all of the above courses.

Lecturer in botany (Log Number SM021421): Duties include but may not be limited to teaching non-majors plant biology, marine botany, biology of algae, and student advising. Ph.D. in biology or related discipline required. Preference will be given to candidates with college-level teaching experience in some or all of the above courses and advising. Evidence for effective teaching may be presented through course materials, student evaluations, and letters of recommendation. For more information about the Department, please visit our website: www.uri.edu/artsci/bio. Send letter of application; curriculum vitae; statement of teaching philosophy; list of courses taught; and three letters of recommendation by May 25, 2001, to: **J. Stanley Cobb, Search Committee Chair, (Log Number 021420, Biology or Log Number 021421, Botany), University of Rhode Island, P.O. Box G, Kingston, RI 02881.** *The University of Rhode Island is an Affirmative Action/Equal Employment Opportunity Employer strongly committed to achieving excellence through increased diversity of its faculty, staff, and students. Women, ethnic minorities, and individuals from underrepresented groups are encouraged to apply.*

MELANOMA RESEARCH University of Louisville

James Graham Brown Cancer Center

The University of Louisville–James Graham Brown Cancer Center announces the availability of a full-time, tenure-track position at the level of **ASSISTANT or ASSOCIATE PROFESSOR**. The successful candidate will have a strong record of research accomplishment and potential in the field of melanoma research, particularly to complement the existing programs in experimental therapeutics. For appointment at the Associate Professor level, the candidate would be expected to have a funded grant. To apply, please submit current curriculum vitae, a description of current and future research interests, and the names and addresses of three persons who can be contacted for letters of recommendation. Submit applications to: **Kelly M. McMasters, M.D., Ph.D., University of Louisville–James Graham Brown Cancer Center, 529 South Jackson Street, Number 318, Louisville, KY 40202.**

The University of Louisville–James Graham Brown Cancer Center is an Equal Opportunity/Affirmative Action Employer.

GENETIC MODIFICATION OF HEART FUNCTION

RESEARCH FACULTY and POSTDOCTORAL POSITIONS are available contingent on experience to investigate cardiac function utilizing transgenesis and DNA viral vector delivery systems (see *PNAS* 96:11982, 1999; *JCI* 103:1459, 1999; *Nature Medicine*, December 1999; *JCI* 107, 2001). See laboratory website for more details: <http://www.personal.umich.edu/~metzgerj/>. Individuals with interests in heart or skeletal muscle and with expertise in the molecular, biochemical, or physiological sciences are sought to join our research group. *NIH training requires U. S. citizenship or permanent resident status.* Send (1) one-page summary of research accomplishments and career goals, (2) curriculum vitae, and (3) names of three references to: **Dr. Joseph M. Metzger, Department of Physiology, 7730 Medical Science II, University of Michigan, Ann Arbor, MI 48109-0622. E-mail: metzgerj@umich.edu.** *The University of Michigan is an Equal Opportunity/Affirmative Action Employer.*

POSITIONS OPEN

DIRECTOR, CENTER FOR NEUROIMAGING

The University of California, Davis, School of Medicine is seeking applications for a Director of Neuroimaging to serve as a **FULL-TIME FACULTY MEMBER** in the regular (tenure-track) series and at a level commensurate with credentials. The candidate must hold an M.D. and/or Ph.D. degree and have a demonstrated record of solid academic accomplishment with expertise in the area of neuroimaging research using functional magnetic resonance imaging. The ideal candidate will also have administrative experience in directing a neuroimaging program and in collaborating with colleagues in other disciplines. The successful candidate will be able to compete for extramural research support and will be interested in developing a neuroimaging research program. UC Davis has made a major commitment to neuroscience research and is expanding its neuroimaging program by purchasing a new 3T MRI scanner, enlarging its current imaging facility, and hiring additional staff to provide infrastructure support for Investigators. The successful candidate will be expected to collaborate in the development of a larger functional neuroimaging research facility at UC Davis that will serve not only his/her own research program but also the research of other clinical and basic neuroscience and medical Investigators.

Please send curriculum vitae, a letter summarizing past research and administrative experience and future research directions, and the names of three references to: **William Jagust, M.D., Chair, Neuroimaging Center Director, Search Committee, Office of the Dean, School of Medicine, University of California, Davis, Medical Science 1C, One Shields Avenue, Davis, CA 95616.** Applications will be accepted until the position is filled but not later than December 21, 2001. *The University of California, Davis, is an Affirmative Action/Equal Opportunity Employer.*

ASSISTANT PROFESSOR OF PHYSICS The University of Texas at Austin

The Department of Physics of The University of Texas at Austin invites applications for a tenure-track **ASSISTANT PROFESSORSHIP** starting September 2002. This is a research and teaching position. Applicants should have a proven record of experimental research in biological physics, soft condensed matter, and/or nonlinear/non-equilibrium phenomena. The successful candidate will assume full teaching responsibilities in the Department of Physics. Prior teaching experience is desirable, and excellent English language communication skills are required. In exceptional cases a more senior appointment with tenure will be considered. Applicants should send curriculum vitae, a statement of research accomplishments, a research plan, and arrange for at least five letters of reference to be sent to: **Professor Roy Schwitters, Chairman, Department of Physics, The University of Texas at Austin, Austin, TX 78712-1081.** Review of completed applications will begin October 1, 2001, and will continue until the position is filled. *The University of Texas at Austin is an Equal Opportunity/Affirmative Action Employer.*

Memorial University of Newfoundland, Newfoundland, Canada, invites applications for two **TENURE-TRACK POSITIONS** in the Departments of Biochemistry and Biology (1) in prokaryotic and/or eukaryotic gene regulation and (2) in comparative animal physiology. Further information including application details appears on the respective Departmental websites: www.mun.ca/biochem/generejob.html and www.mun.ca/biology/appt.htm.

Review of applications will begin June 30, 2001. The appointments will be for September 2001 or as soon as possible thereafter and are subject to budgetary approval. *Memorial University is committed to Employment Equity and encourages applications from qualified women and men, visible minorities, aboriginal people, and persons with disabilities. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.*

POSITIONS OPEN

The Astronomy Department at Cornell University is seeking a **PROJECT MANAGER** for the planning and construction of a 15-m class optical/infrared telescope in the high Atacama Desert in northern Chile. The Manager will assist the telescope team in translating science specifications into technical/engineering specifications for the observatory, set up and oversee a set of trade and engineering studies with university and industrial contractors, develop an engineering concept based on the trade and engineering studies, and develop a cost estimate based on this concept. The applicant should have experience with systems engineering and oversight of industrial contractors. Experience with telescope design and construction is highly desirable. Salary is negotiable.

The initial appointment will be for two years with the possibility of an extension. The first task is the completion of a design and cost study on the basis of which a decision to proceed with the construction of the telescope will be made. More information on the Atacama telescope project can be found at website: <http://astro.cornell.edu/atacama>. Please send a résumé and the names of three references to: **Professor Riccardo Giovanelli, 412 Space Sciences Building, Cornell University, Ithaca, NY 14853-6801.** Application deadline is July 1, 2001. *Cornell University is an Equal Opportunity Employer.*

PH.D. RESEARCHER POSITION

ANESTHESIOLOGY RESEARCH. The University of California, Irvine, will be recruiting during the months of April 20, 2001, to July 5, 2001, for an **ASSISTANT PROFESSOR**, tenure track. Requirements include Ph.D. or M.D. with significant research training or experience. Molecular biology experience is an asset. Opportunities for experimental and clinical research and collaborations with the basic sciences, including biomedical engineering. Present departmental research areas include gas kinetics in anesthesia during nonsteady state (NIH-funded program, HL-42637, systems to cellular physiology) and the study of mechanisms of anesthesia and memory (includes PET and MRI imaging technologies). Duties will include teaching of residents and medical students. Apply to: **Peter H. Breen, M.D., FRCPC, Vice Chair and Director of Academic Affairs, Search Committee Chair, Department of Anesthesiology, UCI Medical Center, 101 The City Drive South, Orange, CA 92668. FAX: 714-456-7702.** *UCI is an Equal Opportunity Employer committed to excellence through diversity.*

VISUAL NEUROSCIENCE University of Southern California

The Neurobiology Section of the Department of Biological Sciences at USC invites applications for a tenure-track position at the **ASSISTANT PROFESSOR** level in the area of visual cortical neurophysiology. Successful applicants will also receive an appointment in our multidisciplinary Neuroscience Program, which includes outstanding strength in visual systems. Send curriculum vitae and statement of research plans and have three letters of recommendation sent to: **Search Committee, Visual Neuroscience, University of Southern California, Los Angeles, CA 90089-2520.** Position is pending final administrative approval. *USC is an Affirmative Action/Equal Opportunity Employer.*

NEUROSCIENCE/NEUROANATOMY INSTRUCTOR. The Department of Basic Medical Science invites applications from individuals qualified to direct a neuroscience course and teach in a laboratory-based neuroanatomy course for medical students. Candidates should have a Ph.D. or equivalent degree in a field relevant to this instruction. The position is not in the tenure track, and academic rank and salary will depend upon qualifications. Send curriculum vitae and have three references sent to: **Chris Paspasian, Ph.D., Chair, BMS, UMKC School of Medicine, 2411 Holmes Street, Kansas City, MO 64108.** Applications by e-mail will be accepted (e-mail: papasianc@umkc.edu). *The University of Missouri–Kansas City is an Affirmative Action/Equal Opportunity Employer Institution.*



Toronto General Hospital

University Health Network

Scientists

Two staff positions are available for Scientists at the Toronto General Research Institute (TGRI), located at University Health Network, an academic health centre fully affiliated with the University of Toronto. TGRI has 130 active Scientists or Clinician Scientists and is the research home of Canada's largest academic teaching hospital. The areas of strength at TGRI include Cardiovascular Sciences, Transplantation, Diabetes and Arthritis/Inflammation. You have the potential to establish high-calibre, internationally significant research programs that will synergize with and augment our existing strengths. Your areas of expertise and interest may be broad, but a specific interest in stem cell biology, gene therapy, genomics, proteomics or bioinformatics would be in line with our strategic direction. However, we are not restrictive in our search and seek the best and brightest to join a vibrant research environment. A Ph.D. or M.D., you have significant postdoctoral or independent research experience and are eligible for a position in an appropriate university basic or clinical department within a Faculty of Medicine. Academic rank will be commensurate with qualifications, but may be at any level including Assistant Professor, Associate Professor or Professor. Successful candidates may also be eligible for a Canadian Research Chair based at University Health Network.

UNIVERSITY HEALTH NETWORK is a major landmark in Canada's health care system and a teaching hospital of the University of Toronto. Building on the strengths and reputation of our three remarkable hospitals, Toronto General Hospital, Toronto Western Hospital and Princess Margaret Hospital, UHN brings together the talent and resources that make us an international leader in health care.

Interested applicants should forward a curriculum vitae, a short letter indicating past research achievements and future goals, and three supporting letters of reference, quoting reference #SS-1 to:

Dr. Keith Stewart, Director
Toronto General Research Institute
Toronto General Hospital, CCRW1-888
200 Elizabeth St., Toronto, ON Canada M5G 2C9

In accordance with Canadian Immigration Requirements, this advertisement is directed to Canadian Citizens and permanent residents of Canada. University Health Network has a diverse work force and encourages applications from qualified women, aboriginal peoples, persons with disabilities and visible minorities.

WWW.UHN.ON.CA • E-MAIL: careers@uhn.on.ca

Professorship in Evolutionary Biology

This position is a full professorship at the Institute of Zoology in the Department of Integrative Biology, University of Basel. Applicants should have an internationally competitive research program, outstanding scientific achievements, and extensive teaching experience in the area of animal evolutionary biology. There are no restrictions concerning the animal groups to be investigated.

The successful candidate will be expected to establish a highly productive research group and to participate in the teaching of general zoology, evolutionary biology, behavioral biology and ecology as well as in advanced practical courses in the laboratory and in the field. The usual contribution to academic administration is expected.

Basel offers a stimulating environment for interdisciplinary interactions in the life science community that includes the Department of Integrative Biology and the Bio-center of the University as well as the associated Swiss Tropical Institute and the Friedrich Miescher Institute.

Applications of woman scientists are specifically encouraged. Applications including a curriculum vitae, a publication list, a short summary of current and future activities in research and teaching, copies of three recent key publications, and names and addresses of three referees, should be sent by **July 6, 2001** to:

Prof. Dr. A. Zuberbühler, Dean Faculty of Science,
 Klingelbergstr. 50, CH-4056 Basel, Switzerland

For additional information contact: Prof. Heinrich Reichert (Heinrich.Reichert@unibas.ch)



DONALD DANFORTH PLANT SCIENCE CENTER

The Danforth Center announces positions for faculty at Full, Associate and Assistant Member levels to direct fundamental research programs. Seeking scientists with broad interests/training in at least two scientific disciplines and well formed research programs that will benefit from interactions with scientists of other disciplines. Demonstration of prior/current support and of interdisciplinary research beneficial. Up to 10 faculty appointments will be considered in structural biology, biochemistry, phytochemistry/nutraceuticals, cell biology, gene regulation, root-soil interactions, molecular plant pathology, physiology, and abiotic stress biology. Successful candidates are expected to develop collaborative research programs within the Danforth Center and/or with scientists at partner institutions. Visit our website, www.danforthcenter.org, for more information about the Danforth Center.

Send a curriculum vitae, reprints and four letters of reference to: **Ms. Billie Broeker, Human Resources, Donald Danforth Plant Science Center, 7425 Forsyth Boulevard, Campus Box 1098, St. Louis, MO 63105.**

The Donald Danforth Plant Science Center is an equal opportunity/affirmative action employer and encourages applications from underrepresented groups, including minorities, women and people with disabilities.

POSITIONS OPEN

ASSISTANT/ASSOCIATE PROFESSOR Faculty Position in Structural Biology Johns Hopkins University

Applications for a tenure-track position are invited from candidates interested in applying structural biology approaches to mechanisms of microbial pathogenesis and infectious disease prevention. The successful candidate will be expected to develop an independent research program that will include potential collaborations with current faculty working in areas of parasitology, virology, bacteriology, entomology, and structural biology. Applicants must hold a Doctoral degree and have a strong publication record in structural biology and X-ray crystallography. A highly competitive start-up package will be provided. Applicants should submit curriculum vitae (including names of three potential sources of recommendation) and a summary of research interests by June 30, 2001, to: **Dr. Richard Markham, Department of Molecular Microbiology and Immunology, Johns Hopkins University School of Public Health, 615 North Wolfe Street, Baltimore, MD 21205.** *Johns Hopkins University is an Affirmative Action/Equal Opportunity Employer.*

FACULTY POSITION PHYSIOLOGY

The Department of Physiology at the University of Texas Health Science Center at San Antonio invites applications for a tenure-track position at the rank of **ASSISTANT or ASSOCIATE PROFESSOR**. Requirements are a Ph.D., M.D., or equivalent and post-doctoral experience. The successful applicant is expected to establish an independent research program in any area of physiology including those complementary to the research strengths of the Department (cardiovascular, cellular/molecular, aging). Responsibilities include teaching graduate and professional students. Salary and start-up funds commensurate with experience. Send curriculum vitae and statement of research goals to: **John M. Johnson, Ph.D., Department of Physiology MC-7756, University of Texas Health Science Center, 7703 Floyd Curl Drive, San Antonio, TX 78229-3900.** Website: <http://physiology.uthscsa.edu>. Please have three letters of reference sent to the same address. *The University of Texas Health Science Center at San Antonio is an Equal Opportunity/Affirmative Action Employer.*

ASSISTANT PROFESSOR: CHEMISTRY

Delaware Valley College, a private four-year institution located in Bucks County, Pennsylvania, invites applications for a tenure-track faculty position to teach organic chemistry, biochemistry, and organic analysis. Ph.D. in organic chemistry or biochemistry; computer/instrumentation skills in organic chemistry, biochemistry and organic analysis; and commitment to undergraduate teaching and mentoring required. Rank and salary is commensurate with educational background and experience. Position is available fall 2001. Send curriculum vitae; statement of teaching philosophy; transcripts; and the names, addresses, and telephone numbers of at least three professional references to: **Chemistry Faculty Search, Human Resources Office, Delaware Valley College, 700 East Butler Avenue, Doylestown, PA 18901.** Website: www.devalcol.edu. *Equal Opportunity Employer.*

ONE RESEARCH ASSISTANT PROFESSOR/ THREE POSTDOCTORAL POSITIONS

Positions funded through grants from NIH and AHA available immediately for suitably qualified individuals with strong experience in molecular biology techniques to study signaling cascades controlling gene expression of human lipoprotein receptors. Please send curriculum vitae and the names of references to: **Dr. Kamal D. Mehta, Department of Biochemistry and Molecular Biology, Mail Slot 516, University of Arkansas College of Medicine, 4301 West Markham Street, Little Rock, AR 72205.** E-mail: mehtakamald@uams.edu.

POSITIONS OPEN

IMMUNEX Creating the Future of Medicine™

When you believe anything is possible, it is.

At Immunex, we have the vision, enthusiasm, and potential to accomplish great things. In less than 20 years, we've grown to be one of the largest biotechnology firms in the nation. And we've just been named one of the "Top 100 Places To Work For" by *Fortune Magazine*. Thanks to the hard work of everyone here, we have seven groundbreaking therapeutics on the market plus 18 more in the pipeline. And the sooner you join our team, the sooner we can work together to change the world—and your career.

STAFF SCIENTIST

As a crucial member of our clinical quality control pharmaceutical testing group, you will develop technologies and methodologies for quality control assays, design and execute the assay validations in accordance with ICH/FDA guidelines, and represent quality control on clinical products at cross-functional teams. You will also provide technical expertise in protein characterization techniques within quality control. The ideal candidates will have a Ph.D. in chemistry, biochemistry, or related scientific discipline; more than five years of experience in a relevant cGMP industrial setting; and knowledge of design and execution of assay validations in accordance with ICH/FDA guidelines. Technical expertise in protein characterization methods such as AAA, protein sequencing, mass spectrometry, HPLC, peptide mapping, carbohydrate analysis, SDS-PAGE, ELISA, and other biochemical procedures are required. Technical writing and verbal communication skills, computer literacy, and the ability to work in a team environment are essential.

Please submit a résumé and cover letter specifying Job Number 01-0170 to e-mail: ImmunexCareers@webhircpc.com; website: www.immunex.com/careers. *Immunex is an Equal Opportunity Employer committed to diversity.*

POSTDOCTORAL POSITIONS available in vascular biology to study molecular, biochemical, cellular, and physiological mechanisms of vascular control and adaptations in animal models of exercise and/or hyperlipidemia. This opportunity will afford the successful candidate exposure to a wide variety of techniques ranging from integrative to molecular, as well as experience in manuscript preparation and grantsmanship. We have a strong record of postdoctoral training with six of our recent trainees in tenure-track faculty positions. Submit curriculum vitae and the names of three references to either: **Dr. Elmer M. Price (e-mail: pricee@missouri.edu) or Dr. M. Harold Laughlin (e-mail: laughlinm@missouri.edu), Department of Veterinary Biomedical Sciences, University of Missouri-Columbia, Columbia, MO 65211.** *MU is an Equal Opportunity/Affirmative Action/Americans With Disabilities Act Employer.*

POSTDOCTORAL POSITION. This laboratory is interested in acquiring a Postdoctoral Fellow with a deep interest in all levels of protein function: structure, dynamics, ground- and transition-state structure and energetics, ligand binding, allostery, the conformational coupling of energetics (molecular motors), and the higher-order organization of catalysis in the cell. Out projects, many of which are structurally grounded, include numerous enzymes that are loosely but not exclusively centered around biomedically important issues in sulfur metabolism. Please send or e-mail your résumé and three letters of recommendation to: **Professor Thomas S. Leyh, Department of Biochemistry, The Albert Einstein College of Medicine, Jack and Pearl Resnick Campus, 1300 Morris Park Avenue, Bronx, NY 10461.** E-mail: leyh@acom.yu.edu. *Equal Opportunity Employer.*

POSITIONS OPEN

FACULTY POSITION in neuroscience of human nervous system disease. Applications are invited from highly qualified individuals with a Ph.D., and/or M.D. degree in a biomedical science for a tenure-track position at the level of **ASSOCIATE PROFESSOR** or **PROFESSOR**, New York University School of Medicine (NYUSM) at the Nathan Kline Institute (website: <http://www.rfmh.org/nki>). NKI, an affiliate of NYUSM located on a suburban campus 15 miles north of Manhattan, recently completed a major expansion, which includes newly constructed facilities for basic and clinical research. NKI has over 50 full-time faculty with active, funded program interests in Alzheimer's, Parkinson's and related dementias, schizophrenia, and addictive disorders. Research areas include amyloid biology, vesicular trafficking, cytoskeleton dynamics, neuronal cell death, LTP and synapse physiology, transgenic modeling and gene targeting, genomics, *in vivo* electrophysiology, animal and clinical neuroimaging, and clinical trials. The successful applicant should have an active, extramurally funded research program that will complement existing interests and/or expand into new areas of molecular, cellular, systems, or clinical neuroscience. Candidates with programs in molecular or human genetics are especially encouraged to apply. Excellent opportunities exist for interdisciplinary collaborations on multiple campuses. Applications including curriculum vitae, statement of research interests, and three references should be sent to: **Search Committee, Attention: Janet Rosdil, Nathan Kline Institute/NYUSM, 140 Old Orangeburg Road, Orangeburg, NY 10962.** *Equal Opportunity Employer/Affirmative Action Employer. Applications from women and underrepresented minorities are particularly encouraged.*

POSTDOCTORAL FELLOW HARVARD MEDICAL SCHOOL MASSACHUSETTS GENERAL HOSPITAL

Two positions are available immediately in the Center for Molecular Imaging Research at Massachusetts General Hospital/Harvard Medical School to develop novel synthetic vectors for imaging probe delivery, drug targeting, and gene therapy. Candidates with expertise in bioorganic chemistry plus cell culture, bioconjugation, biochemistry, or biophysics are invited to apply. The applicant must be U.S. citizen or permanent resident. Please send curriculum vitae and contact information for three references to: **Dr. Ching Tung, Center for Molecular Imaging Research, Massachusetts General Hospital, 149 13th Street, Number 5406, Charlestown, MA 02129.** E-mail: tung@helix.mgh.harvard.edu.

ASSISTANT PROFESSOR of biology: SUNY College at Old Westbury. Full-time tenure-track position available August 27, 2001. Ph.D. in biological sciences required. Duties include teaching vertebrate physiology, introduction to biology, and other electives. Working experience in a multicultural setting preferred. Of particular interest are candidates who will develop an independent research program that involves undergraduate student participation. Send letter and résumé to: **SUNY College at Old Westbury, Office of Human Resources, Search Committee (BIO), Box 210, Old Westbury, NY 11568.** *Affirmative Action/Equal Opportunity Employer.*

A **POSTDOCTORAL POSITION** is available in Myocardial Biology Unit at Boston University involving integrative work in molecular biology and physiology to study the role of extracellular matrix proteins in pathogenesis of heart failure. The work will focus on osteopontin and integrin signaling. Highly motivated individuals with experience in biochemistry, molecular biology, physiology, or cell biology will be considered. Send curriculum vitae to: **Dr. Krishna Singh, X-706, Boston Medical Center, 650 Albany Street, Boston, MA 02118.** E-mail: krishna.singh@bmc.org.

Even a cancer cell bears a "fingerprint" unique from patient to patient. Just as each patient's cancer cells are unique, so should the patient's cancer-fighting medicine be. Creating personalized medicines is the work of Antigenics, a pioneer in the field. Advanced clinical trials of our cancer immunotherapy products are yielding impressive results. Those results, together with emerging products for infectious diseases and autoimmune disorders, have us rapidly expanding. Join Antigenics in one of these positions:

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Be part of a pioneering, much-talked-about biomedical field. To apply, please forward your resume to: **Antigenics Inc., 34 Commerce Way, Woburn, MA 01801. Fax: (781) 938-6496. Email: recruiter@antigenics.com** Antigenics is an equal opportunity employer and values the diversity of employees. We provide a comprehensive program of compensation and benefits to our employees in keeping with the quality of the people that have chosen to work at Antigenics.



**UNIVERSITY OF NORTH DAKOTA
School of Medicine and Health Sciences
VICE PRESIDENT FOR RESEARCH**

Applications and nominations are invited for the new position of Vice President for Research at the University of North Dakota. The chief research officer of the university reports directly to the president and is responsible for the promotion, administration and service of the research program. We seek an energetic, creative, people-oriented individual to enhance our efforts for external funding in support of research, scholarship and technology transfer. The individual selected will develop strategic relationships, long term strategies, and mechanisms to facilitate a successful enterprise. He/she will work closely with the vice presidents, deans, department chairs, faculty and the university's liaison in Washington. The Vice President for Research will supervise existing compliance and support areas related to research.

The University of North Dakota, founded in 1883, has more than 11,000 students in physical and natural sciences, humanities, social sciences, aerospace sciences, engineering, medical sciences, nursing, fine arts, business, law, education and human development. The graduate student enrollment is 1,500 per semester with 350 masters and 40 doctoral degrees awarded per year and is expected to grow as directed by UND's strategic plan. The university currently acquires over \$40 million annually in external research programs with an initial goal of \$100 million. UND is a vibrant, comprehensive institution with a rich history located in a safe and friendly community of 60,000 people.

Qualifications include experience in administration, a substantial record of research, success in securing extramural funding, and a Ph.D. or equivalent degree with credentials for a tenured faculty position in a department. Strong commitments to interdisciplinary research, to undergraduate and graduate research, and to building partnerships with government, industry, professions, and the community are especially desirable.

Additional information is available at www.und.edu.vpresearch

Review of applications will begin immediately and continue until the position is filled. Nominations are strongly encouraged. The anticipated date of appointment is October 1, 2001. A letter of application, curriculum vitae, a statement of the applicant's philosophy of university-based research, and names and addresses of three references should be sent to:

H. David Wilson, M.D., Dean
Chair, Vice President for Research Search Committee
UND School of Medicine & Health Sciences
P.O. Box 9037
Grand Forks, ND 58202-9037
e-mail: hdwilson@medicine.nodak.edu (701)777-2514



Women and minorities are strongly encouraged to apply. Applicants with special needs or disability accommodation requirements should make the request with the Search Committee Chair. The University of North Dakota is an Equal Opportunity, Affirmative Action Employer.



The Neuro-Oncology Branch of the National Cancer Institute and National Institute of Neurological Disorders and Stroke of the National Institutes of Health are currently recruiting several postdoctoral level scientists to work in the area of glial tumor cell biology, genetics, and experimental therapeutics. The successful candidates should have an M.D. or Ph.D. and have received training in molecular/cellular biology, genetics and/or protein chemistry. Laboratory projects include the study of the molecular and genetic pathogenesis of glial neoplasms, neural and endothelial stem cell biology, genetic vectors, and tumor angiogenesis for the purpose of identifying novel anti-tumor molecular targets. Experience with either microarray gene expression and/or proteomic technologies, viral or non-viral vector delivery systems, or stem cell biology would be desirable.

Please send curriculum vitae, statement of research interests and two letters of reference to **Howard A. Fine, Chief, Neuro-Oncology Branch, National Cancer Institute, 10 Center Drive, MSC1911, Building 10, Room 12S245, Bethesda, MD 20892-1911.**

The NIH is an Equal Opportunity Employer.



**POSTDOCTORAL POSITIONS
Mayo Clinic Rochester
Rochester, MN**

Mayo Clinic Rochester has established a Molecular Medicine Program with several groups working on gene therapy using different viral systems. Postdoctoral positions are available immediately in the laboratory of Mark J. Federspiel, Ph.D., a faculty member of the Molecular Medicine Program. Research projects are focused on fundamental studies of the cellular entry mechanisms of a model retrovirus, avian leukosis virus, and include structure/function analysis of the envelope glycoprotein/receptor interactions and the evolution of host range. Some of our current research is described in recent publications [*J. Virol.* 75:726-737 2001; *Virology* 273:111-123 2000; *J. Virol.* 73:10051-10060 1999].

Applicants must have a recent Ph.D. degree, be highly motivated, and be proficient in advanced molecular biological and tissue culture techniques. Research experience in virology, especially retrovirology, is highly desirable. Salary will be determined by the successful candidates' experience. There is also an attractive benefit package. Mayo Foundation is a non-profit physician led clinical practice integrated with education and research in a unified multi-campus system. To apply, send a current curriculum vitae and bibliography, a summary of past research accomplishments, and the names and contact details of three references to:

**Mark J. Federspiel, Ph.D.
Mayo Clinic Rochester
Molecular Medicine Program
Guggenheim 18
200 First Street, SW
Rochester, MN 55905**

E-mail: federspiel.mark@mayo.edu

See also: <http://www.mayo.edu/research/mmp/>

Mayo Foundation is an affirmative action and equal opportunity employer and educator.

POSITIONS OPEN



DIRECTOR OF BIOCHEMICAL AND MATERIALS RESEARCH

Luna Innovations, one of the fastest-growing companies in Virginia, seeks a candidate to direct research and development in areas of nanotechnology and advanced fiber optic biological and chemical sensors within a creative and dynamic environment. Qualified applicant will lead a group developing immunoassays, protein chemistry techniques, nanomaterial-based technology, and fiber optic sensors. The candidate will be immediately responsible for the direction of over \$5 million in research funding and will be responsible for understanding opportunities, fostering creative thought, distilling insights into research projects, and guiding these projects to completion. The Director will manage a group of Scientists and Technicians working in biochemical and materials research. Some travel and customer interface will be required.

M.S. degree is required and a Ph.D. preferred with experience in the fields of analytical chemistry, polymer chemistry, nanomaterials and nanotechnology, molecular biology, and biotechnology. More than five years of experience in the management of multidisciplinary projects required. Experience in project management and demonstrated ability to secure research and development funding. Excellent motivational, leadership, and communications skills required.

Located in Blacksburg, Virginia, our employees enjoy the best of a high-technology community close to Virginia Tech while maintaining a small-town, family-friendly atmosphere with exceptional recreation and lifestyle opportunities. Excellent compensation including performance-based stock options; comprehensive benefits package including medical, dental, 401(k) plans, tuition assistance; and a liberal paid time-off program.

If interested, send résumé to: **Human Resources, P.O. Box 11704, Blacksburg, VA 24062-1704. E-mail: engebritsonl@lunainnovations.com.** *Equal Opportunity Employer/Affirmative Action.*

SECTION RESEARCH BIOLOGIST. Manage facility and staff of five Researchers responsible for but not limited to activities in production of plant cDNA and normalized cDNA libraries for DNA sequencing and extraction of important genes from them. Analysis of sequence information in liaison with Bioinformaticians. High-throughput RNA transcript profiling including microarray analysis for gene expression. High-throughput yeast two-hybrid analysis for gene identification and characterization. Collaboration with selected project teams to ensure their directions are appropriate and that they attain goals on time to enable the company objectives to be met in a timely fashion. Ensure biological objectives of the company are served by state-of-the-art management of information and high-throughput molecular technologies. Help to formulate company. Requires Master's in biotechnology or closely related field. Two years of experience in job offered or two years of postgraduate research or postgraduate fellowship. Postgraduate experience in design and operation of high-throughput screening technologies. Solid understanding of enabling technologies and processes utilized to expedite gene, plant, or therapeutic discovery and development. Experience using novel molecular gene identification and express technologies. Forty hours per week; salary commensurate with experience. Résumés to: **Box 100, 1200 New York Avenue, N.W., Room 914, Washington, DC 20005.**

Gastrointestinal RESEARCH FELLOWSHIP to study molecular regulation of intestinal epithelial ion transport or pancreatic acinar cell function and pancreatitis. Requirements: *U.S. citizenship or permanent resident status.* Begin by June 30, 2001. Apply to: **Dr. Henry Binder, Box 208019, Yale University School of Medicine, New Haven, CT 06520-8019. FAX: 203-737-1755; e-mail: henry.binder@yale.edu.**

POSITIONS OPEN

PROFESSOR AND HEAD Department of Biochemistry and Molecular Biology Louisiana State University Health Sciences Center New Orleans

Louisiana State University Health Sciences Center in downtown New Orleans invites applications and nominations for Professor and Head of the Department of Biochemistry and Molecular Biology in the School of Medicine. The successful applicant will be responsible for directing departmental activities in education, research, and service. This involves interactions with all schools of the Health Sciences Center. Research strengths within the Department currently include cancer biology, neurochemistry, heart cell differentiation, and aging. Visit the Department's website: www2.medschool.lsuhsu.edu/bioc. LSUHSC is presently undergoing a period of expansion with the recent addition of over 100,000 square feet of new research space and the purchase of state-of-the-art DNA microarray instrumentation, as well as supporting one of the top peptide core laboratories in the United States.

The successful applicant will have demonstrated significant accomplishments in teaching and research with a consistent record of extramural funding. Candidates should provide curriculum vitae including a full list of publications; past and current research support; and a brief statement of educational, research, service, and administrative interests. These materials as well as a list of three to five potential references should be forwarded by June 15, 2001, to:

**Dr. Ronald Luftig
Chair, Biochemistry Search Committee
LSU Health Sciences Center
Box P6-I
1901 Perdido Street
New Orleans, LA 70112**

LSUHSC is an Equal Opportunity/Affirmative Action Employer. Women and underrepresented minority candidates are encouraged to apply.

The Infectious Disease Division of the Department of Medicine and the Center for AIDS Research in the School of Medicine at the University of Pennsylvania has a faculty position opening in the tenure track at the level of **ASSISTANT PROFESSOR/ASSOCIATE PROFESSOR, or PROFESSOR.** We are seeking an individual who is Board certified and Fellowship trained in infectious diseases or other subspecialty in internal medicine with a particular interest in HIV translational research; that is, Investigators who use patient samples to study basic science questions. Academic rank will be commensurate with credentials and experience. Position will be available starting July 1, 2001, to July 1, 2001. Send curriculum vitae, a summary of research experience, future research plans, and three letters of recommendation to: **Harvey Friedman, M.D., Division of Infectious Diseases, 502 Johnson Pavilion, Philadelphia, PA 19104-6073. FAX: 215-349-5111; e-mail: hfriedma@mail.med.upenn.edu.** *The University of Pennsylvania is an Equal Opportunity/Affirmative Action Employer. Women and minorities are strongly encouraged to apply.*

POSTDOCTORAL and RESEARCH ASSOCIATE POSITIONS available immediately for highly motivated candidates to join a multidisciplinary group studying RNA-protein interactions involved in HIV-1 replication. Strong background in molecular and cell biology is required and prior experience in gene expression at the cellular level is essential. Send curriculum vitae and names of three references to: **Dr. Tariq M. Rana, Department of Pharmacology, Robert Wood Johnson Medical School, 675 Hoes Lane, Piscataway, NJ 08854. E-mail: rana@umdj.edu; website: <http://lifesci.rutgers.edu/~molbiosci/Professors/rana.html>.**

POSITIONS OPEN



MOLECULAR BIOLOGIST/ RESEARCH CHEMIST

The Eastern Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture, Dairy Products Research Unit, has an opening for a permanent full-time Molecular Biologist/Research Chemist, GS-1320-11/12. The facility is located on an attractive 27-acre campus in Wyndmoor, Pennsylvania, just outside Philadelphia. The individual will serve as an independent Scientist and research team member working on microbial technology/biochemical genetics projects on gene expression in lactic fermentation bacteria leading to foods with improved functional, health promoting, and storage properties. *Candidates must be U.S. citizens and must demonstrate* (1) knowledge of principles, techniques, and procedures of molecular biology/biochemical genetics, microbiology, and biochemistry; (2) skills in gene analysis, design, cloning, expression and mutagenesis, DNA amplification, quantification, and sequencing; and (3) ability to design, plan, conduct, and publish research in the area of gene function and expression in lactic fermentation bacteria. Starting salary is commensurate with experience (\$44,581 to \$69,456 per year). For information on the research program, contact: **Dr. George A. Somkuti; Telephone: 215-233-6474 or e-mail: gsomkuti@arserrc.gov.** This position has specific education and experience requirements and factors that must be addressed. For information on application procedures/forms, call **Mary Ann Byrne; Telephone: 215-233-6571** or print from website: <http://www.ars.usda.gov>. Applications must be marked **ARS-X1E-1339** and postmarked by May 31, 2001. *USDA/ARS is an Equal Opportunity Employer. Women and minorities are encouraged to apply.*

POSTDOCTORAL POSITIONS

Molecular Immunology University of Virginia School of Medicine

Positions are available in the laboratories of **M. G. Brown, Y. Takagaki, and SM. Fu.** **Dr. Brown** studies molecular mechanisms in NK cell-mediated viral immunity. **Dr. Takagaki** studies the molecular mechanisms underlying gene expression regulation, cell proliferation, differentiation, and apoptosis by CstF. **Dr. Fu** studies cellular and genetic factors in SLE. Qualified candidates will have an M.D. and/or Ph.D. in biochemistry, molecular/cellular biology, molecular genetics, or immunology. Applicants should send curriculum vitae, summary of research experience, and names of three references to: **M. G. Brown (e-mail: mgb4n@virginia.edu), Y. Takagaki (e-mail: yt2a@virginia.edu), or SM. Fu (e-mail: sf2e@virginia.edu), Rheumatology and Immunology—Internal Medicine, UVA Box 800412, Charlottesville, VA 22908.** Positions opened until filled. *The University of Virginia is an Equal Opportunity/Affirmative Action Employer.*

Several positions including **SCIENTIST, POSTDOCTORAL ASSOCIATE, and RESEARCH ASSOCIATE** are available at Mendel Biotechnology, a plant biotechnology company in the San Francisco Bay area. The three-year project in plant functional genomics is funded by the Advanced Technology Program from NIST (Department of Commerce); website: <http://jazz.nist.gov/atpcf/prjbriefs/prjbrief.cfm?ProjectNumber=00-00-4084>. Experience in plant molecular biology is required and some experience in histology and bioinformatics is desirable. Please send your curriculum vitae to: **James Zhang, Mendel Biotechnology, 21375 Cabot Boulevard, Hayward, CA 94545. E-mail: jzhang@mendelbio.com; website: <http://www.mendelbio.com/>.**

**Staff Scientist
Laboratory of Molecular Immunology
Division of Intramural Research
National Heart, Lung and Blood Institute, NIH
Bethesda, MD**

The National Heart, Lung, and Blood Institute (NHLBI), Division of Intramural Research, Laboratory of Molecular Immunology, Molecular and Cellular Toxicology Section, is seeking a Staff Scientist to assist in the development and execution of research programs to study the molecular basis of drug-induced allergic hepatitis. The incumbent must have a Ph.D. or M.D., as well as postdoctoral experience and strong publication record in the field of drug-induced hepatitis dealing with drug metabolism, drug toxicology, cellular biology, immunochemistry, gene chip technology, autoimmunity, and animal model development. The period of the initial appointment will be two years.

The successful candidate will be offered a competitive salary and benefits under Title 42. Applications must be received by **May 11, 2001**. Please submit curriculum vitae, bibliography and a brief statement of research interest along with three letters of reference to:

**Ms. Kim Westervelt, Personnel Office
National Heart, Lung and Blood Institute
31 Center Drive, MSC 2484
Building 31, Room 5A28
Bethesda, MD 20892-2484
Westerveltk@nhlbi.nih.gov**

Please include vacancy identifier, HL-01-0047, on ALL correspondence.

NIH is an Equal Opportunity Employer

PHYSICIST

Series/Grade: ZP-1310-IV (\$63,211 - 97,108)

The NIST Center for Neutron Research (NCNR) of the National Institute of Standards and Technology (NIST), Department of Commerce has a staff research position opening for a physicist, who will be the principal investigator for the Spin Polarized Inelastic Neutron Scattering Spectrometer, a member of the development team for next-generation triple axis spectrometers, and who will lead the research program in low dimensional and frustrated magnetic materials at the NCNR. Research to be performed in this program will require skills and specific expertise in inelastic neutron scattering and diffraction from single crystals and powders, the design and operation of cold neutron and thermal neutron crystal spectrometers, horizontal and vertical neutron focusing techniques, and position-sensitive neutron detector systems. In addition, the ability to develop analytical techniques, computer modeling methods, and numerical instrument resolution calculations to optimize data collection on the crystal spectrometers, and carry out the data collection is required. In addition, the ability to develop the analytical and numerical data analysis capabilities to interpret neutron data, requiring skill in software development for data acquisition and analysis, is required as well as the ability to plan and implement improvements in experimental facilities, particularly the crystal spectrometers.

Announcement Number: NIST-01-1440/SP

Closing Date: Applications must be postmarked by May 21, 2001 in order to receive consideration.

Interested applicants should visit www.nist.gov/jobs and www.usajobs.opm.gov for more detailed position requirements and vacancy announcement. To apply, please submit a complete application to:

**NIST-HRMD
Vacancy Number NIST-01-1440/SP
100 Bureau Drive, MS 3550
Gaithersburg, MD 20899**

*NIST is an Equal Employment/Affirmative Action Employer.
U.S. citizenship is required.*

Technical Contact: Dr. Lynn, 301-975-6246



NIH Health Scientist Administrators

The Center for Scientific Review (CSR) at the National Institutes of Health (NIH) seeks to identify highly qualified research scientists who are interested in serving as Scientific Review Administrators for NIH study sections. They should have broad scientific knowledge of, and a history of proven independent research experience in, one of the following areas: AIDS research, behavioral science, bioanalytical chemistry, biochemistry, bioengineering, bioinformatics, biophysics, biostatistics and/or research design, cancer research, cell biology, epidemiology of aging, immunology, instrumentation, microbiology, neuroscience (visual perception), neurodegeneration, proteomics, psychopathology, social sciences, or structural genomics.

Applicants should be highly motivated individuals with excellent judgment and highly developed communication, analytic, interpersonal, organizational and writing skills. These individuals will shape the future of scientific review.

Scientific Review Administrators are responsible for understanding the current state and identifying future directions of a specific area of biomedical and behavioral science; selecting members of review panels; managing study section meetings; facilitating interactions with study section members and communicating the results of their deliberations and recommendations to applicants and the staff of the NIH institutes that fund the research.

Applicants must have: a Ph.D. or equivalent degree (or have equivalent training and experience), postdoctoral research training, a significant record of independent research accomplishment, and administrative experience. Salary will depend on experience and accomplishments. A recruitment or relocation bonus may be available.

Please send your curriculum vitae to:

**Jean K. Paddock, Ph.D.
Center for Scientific Review
National Institutes of Health
6701 Rockledge Drive, Room 5100
Bethesda, MD 20817
or
SRAJobs@mail.nih.gov**

Selection for all positions will be based on merit, with no discrimination for non-merit reasons, such as race, color, sex, national origin, marital status, handicap, age, sexual orientation, or membership/non-membership in an employee organization. Deadline for consideration: July 6, 2001.

NIH is an Equal Opportunity Employer

POSITIONS OPEN

MOLECULAR BIOLOGIST/ MICROBIOLOGIST

The Eastern Regional Research Center, Agricultural Research Service, U.S. Department of Agriculture has an opening for a permanent, full-time Microbiologist/Molecular Biologist, GS-0401-11/12/13. Salary is commensurate with experience (GS-11, \$44,581 to \$57,954; GS-12, \$53,431 to \$69,456; GS-13, \$63,538 to \$82,605 per year). The Center is located on an attractive 27-acre campus just outside Philadelphia in Wyndmoor, Montgomery County, Pennsylvania. The individual will serve as an independent Scientist and research team member responsible for studying (1) the mechanisms of survival of *Campylobacter* in response to environmental challenges and (2) the role of quorum sensing in regulation of cellular functions in food-borne pathogens. *Candidates must be U.S. citizens and must demonstrate* (1) knowledge of the principles, techniques, and procedures of microbiology and molecular biology; (2) ability to design, plan, conduct, and publish research in the area of molecular analysis of stress responses in food-borne pathogenic bacteria; and (3) skill in molecular biology techniques such as gene cloning and expression, gene mutagenesis, and DNA amplification, quantification, and sequencing. For information on the research program, contact: **Dr. Pina Fratamico; Telephone: 215-233-6525; e-mail: pfratamico@arserrc.gov**. This position has specific education and experience requirements and factors that must be addressed. To ensure submission of a complete application, applicants must request a copy of the vacancy announcement by calling **Mary Ann Byrne; Telephone: 215-233-6571** or by printing it from the **website: <http://www.ars.usda.gov>**. Applications must be marked **ARS-XIE-1335** and postmarked by June 4, 2001. *USDA/ARS is an Equal Opportunity Employer. Women and minorities are encouraged to apply.*

BIOTECHNOLOGY APPLERA CORPORATION

At Applera Corporation, we're committed to ensuring that biological information plays a pivotal role in the future of medicine and the well-being of humankind. From genomic information to instrument systems, we enable science for life. We are currently recruiting at all levels for the following positions in various locations including Houston, Texas; Framingham, Massachusetts; and Foster City, San Jose, and Pleasanton, California.

SCIENTISTS, CHEMISTS, AND ENGINEERS: DNA sequencing projects, research and development, genetic analysis, bioinformatics, and molecular microbiology.

SALES ENGINEERS AND FIELD SUPPORT ENGINEERS: Product Specialists, Mass Spectrometry Sales Specialists, sales and market development for protein analysis instrumentation products.

Regional positions: Work at various customer sites: Illinois and Midwestern States, Colorado and Rocky Mountain States, California and Western States, Texas and the Southwest.

Interested candidates should send their résumés to: **Applera Corporation, Human Resources Department, 850 Lincoln Centre Drive, Foster City, CA 94404. FAX: 650-638-5874**. For more information on these and other career opportunities, visit our **website: www.abcareers.com**. *Applera Corporation is an Equal Opportunity Employer and welcomes diversity in the workplace.*

The Gertrude H. Sergievsky Center seeks **STAFF ASSOCIATES** to work on research projects in the field of perinatal epidemiology. Responsibilities include maintaining large databases, undertaking statistical analyses, assisting with grant writing, and preparing manuscripts for publication. Must have Master's degree in epidemiology or biostatistics and proficiency in either SPSS or SAS. Send résumé to: **Louise Kuhn, Ph.D., Sergievsky Center, Columbia University, 630 West 168th Street, New York, NY 10032**. *We take Affirmative Action toward Equal Employment Opportunity. Job Number 9060.*

POSITIONS OPEN



DEPARTMENT OF GENERAL SERVICES

ENVIRONMENTAL CHEMIST Richmond, Virginia

The Virginia Division of Consolidated Laboratory Services (DCLS), the largest public consolidated laboratory in the United States, is seeking an expert in analytical organic chemistry to lead in the development of methods to detect low levels of organic chemicals in biological specimens. Ph.D. in analytical chemistry or closely related field with experience in MS/MS, GC/MS, LC/MS, and HPLC is strongly preferred. Position Number CL554. Starting salary range: \$45,607 to \$65,000. Apply by June 15, 2001.

For more information, please contact: **e-mail: dwinters@dgs.state.va.us; Telephone: 804-786-5305**. Submit state application to: **DGS-HR, P.O. Box 644, Richmond, VA 23218-0644; FAX: 804-371-7841**. Download application at **website: www.dhrm.state.va.us/forms.htm**. Background check. *Equal Opportunity Employer.*

RESEARCH ECOLOGIST OR RESEARCH FORESTER

The Forest and Rangeland Ecosystem Science Center (FRESC) is seeking applications for a permanent full-time position as a Research Ecologist or a Research Forester. FRESC is a component of the Biological Resources Division of the U.S. Geological Survey (USGS) located on the campus of Oregon State University, Corvallis, Oregon. The primary duties will include (1) integrating existing research and coordinating future research conducted under the Cooperative Forest Ecosystem Research project; (2) addressing research needs of resource management agencies; and (3) developing a complex research program to address a multiple set of topics such as reforestation, effects of fire, tree harvest, and other disturbances of forest community development. The incumbent must have a Ph.D. in forestry, natural resources, or botany with a specialization in forest ecology. The successful candidate will be able to demonstrate a history of the ability to propose, fund, conduct, and publish research in forest ecology. Salary ranges from \$51,927 to \$80,279 per year and benefits include health and life insurance coverage, flexible work schedules, Employee Assistance Program, vacation and sick leave, and family-friendly leave policies. The advertisement for this position will be posted under two different titles: Research Ecologist and Research Forester. To apply to this position, go to the **USA Jobs website: www.usajobs.opm.gov** and locate the following announcements: **USGS-W-01-001; Research Ecologist GS-408-12/13 and USGS-W-01-002; Research Forester GS-460-12/13**.

The announcement contains instructions on how to apply and describes the qualification requirements and basis for rating applications and supplemental information that is required. Your application must be received in the Human Resources Office by the closing date of the announcement to be considered. For further information about the position, contact: **Gary Larson, 541-750-7396**. *The USGS is an Equal Opportunity Employer. Selection for this position will be based solely on merit, fitness, and qualifications without regard to race, sex, color, religion, age, marital status, national origin, nondisqualifying handicap conditions, sexual orientation, or any other nonmerit factors. This agency provides reasonable accommodation to applicants with disabilities.*

POSTDOCTORAL POSITION is available immediately to study function and signaling of leukocyte G protein-coupled receptors (*J. Exp. Med.* **192**: 433-438, 2000; *JBC* **274**: 37087-37092, 1999). Experience in molecular biology and/or mouse models is desired. Send curriculum vitae to: **Haribabu Bodduluri, Ph.D., James Graham Brown Cancer Center, Room 428, University of Louisville, 529 South Jackson Street, Louisville, KY 40202-3256. E-mail: H0bodd01@gwise.louisville.edu**. *University of Louisville is an Equal Opportunity/Affirmative Action Employer.*

POSITIONS OPEN

The Illinois Institute of Technology's Biophysics Collaborative Access Team (BioCAT) at the Advanced Photon Source (**website: www.bio.aps.anl.gov**) seeks a beamline Scientist with a Ph.D. in biophysics, physics, chemistry, or biology. The successful candidate will have expertise in X-ray synchrotron radiation studies (e.g., fiber diffraction, macromolecular crystallography, low angle X-ray solution scattering, or X-ray spectroscopy) of biological systems. Primary responsibilities include experimental support for visiting Scientists and experimental design/configuration. Experience with data analysis, detectors, and hardware/software interfacing is beneficial. The successful candidate will be encouraged to develop an active collaborative research program. Please submit curriculum vitae and reference list to: **Ms. Claren Krolik, BioCAT, APS, Argonne National Laboratory, 9700 South Cass Avenue, Building 435B, Argonne, IL 60439. E-mail: krolik@bio.aps.anl.gov**.

Illinois Institute of Technology adheres to Affirmative Action/Equal Employment Opportunity policies and strongly encourages applications from members of minority groups and women.

PROTEOMICS APPLICATIONS SPECIALIST

Bio-Rad Laboratories, located in Hercules, California, has an immediate opening for a Proteomics Applications Specialist in the Life Science Division. The successful candidate will provide field application support for proteomics. This includes applications support for both customers and sales representatives. Duties also will include seminars and training sessions. A Ph.D. in biochemistry or related discipline or equivalent experience is preferred for the position. The candidate must also possess good communication skills and the ability to easily and convincingly describe complex problems. Candidate should have an aptitude for preparing and giving presentations. More than two years of research experience in protein chemistry or equivalent is desired. Sales or marketing experience is an asset. Hands-on experience in proteomics a plus. To apply for this position, please e-mail your résumé to: **jobs@bio-rad.com** indicating Job Code L01-080; **FAX: 800-370-6913**. For more information, please visit our **website: www.bio-rad.com**.

RESEARCH SCIENTIST POSITION

The Department of Physiological Sciences seeks an individual with interests in microbial genetics and molecular approaches to identification of bacterial pathogens. Necessary qualifications include a Ph.D. and training in molecular biology, recombinant libraries, microbial genetics, bioinformatics, and separation technologies. Appointment will be at the rank of **RESEARCH SCIENTIST**, a non-tenure-track faculty position in the College of Veterinary Medicine. Applicants should send their curriculum vitae and three letters of recommendation to: **Dr. Cyril R. Clarke, Professor and Head, Physiological Sciences, 264 McElroy Hall, Oklahoma State University, Stillwater, OK 74078-2014**. The deadline for applications is May 20, 2001, or until a suitable candidate is identified. *Oklahoma State University is an Affirmative Action/Equal Opportunity Employer committed to multicultural diversity.*

POSTDOCTORAL POSITION

The Infectious Disease Division at the University of Pennsylvania is looking to recruit an M.D. Postdoctoral Fellow for a position on a NIH training grant. Candidates can choose to train in virology or microbial immunology. The training mentors are well-established Scientists on Penn's campus. Qualifications include *U.S. citizenship or permanent resident visa* and interest in pursuing an academic career in bench research. Send curriculum vitae and three letters of recommendation to: **Harvey Friedman, M.D., Division of Infectious Disease, 502 Johnson Pavilion, Philadelphia, PA 19104-6073. FAX: 215-349-5111; e-mail: hfriedman@mail.med.upenn.edu**. *The University of Pennsylvania is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.*



Molecular Mechanisms of Development

Postdoctoral Fellow/Research Associate

Positions available to investigate molecular, molecular genetic and/or cellular signal transduction mechanisms of vertebrate development. Specific areas of investigation include: genomic/proteomic analysis of signal transduction, regulation of gene expression, transcriptional co-activators & co-repressors, and molecular determinants of normal and abnormal development. Background in molecular/molecular genetic methodologies, cell and/or developmental biology required.

Applicants should submit: (1) *curriculum vitae*, (2) statement of current research activities and (3) names of three references to: **Dr. M.M. Pisano, Birth Defects Center, Department of Molecular, Cellular and Craniofacial Biology, Health Sciences Center, 501 South Preston Street, Suite 301, University of Louisville, Louisville, KY 40202. Email: Pisano@Louisville.edu.**

The University of Louisville is an EEO/AA employer. Women and minorities are encouraged to apply.

UNIVERSITY of LOUISVILLE.

Postdoctoral Position

MRC Clinical Sciences Centre, London

A postdoctoral position is available at the MRC Clinical Sciences Centre in the laboratory of Dr. Niall Dillon. The group uses genes that are expressed during B cell development as model systems to study the role of chromatin structure and nuclear organisation in mammalian gene regulation (see *Cell* 103,733; *Mol. Cell. Biol.* 19,671). We have recently shown that the nuclear factor Ikaros acts on the promoter of the $\lambda 5$ gene to repress transcription in mature B cells. The project will focus on the mechanisms by which members of the Ikaros protein family mediate stage specific silencing of $\lambda 5$ expression during B cell development.

The MRC Clinical Sciences Centre is located at Hammersmith Hospital in west London, a short underground ride from the centre of one of Europe's most exciting and vibrant capital cities. The Institute, which is directly funded by the MRC, has a number of groups studying mammalian gene regulation and nuclear structure and has excellent facilities for this type of work. Additional details about the scientific programmes at the CSC can be found at: www.csc.mrc.ac.uk

The appointment will be to the MRC's pay band 3 (salary range £26-40k) or band 4 (salary range £20-30k), depending on experience. A salary supplement equivalent to 6% of basic [rising to 9% in August 2002] is also payable together with location allowance of £2.5k. Some assistance will be available to individuals relocating from overseas.

Enquiries and applications (including curriculum vitae) should be directed to **Dr. Niall Dillon, MRC Clinical Sciences Centre, Imperial College School of Medicine, Hammersmith Hospital, Du Cane Road, London W12 0NN, United Kingdom, (Tel. +44 20 8383 8233; email: niall.dillon@csc.mrc.ac.uk).**

'Leading Science for Better Health'

*The Medical Research Council is an
Equal Opportunities Employer*



**NATIONAL CENTER FOR COMPLEMENTARY & ALTERNATIVE MEDICINE
NATIONAL INSTITUTES OF HEALTH**

DIRECTOR OFFICE OF CLINICAL AND REGULATORY AFFAIRS

THE CHALLENGE: The National Center for Complementary and Alternative Medicine (NCCAM), NIH, is seeking exceptional candidates for the position of Director, Office of Clinical and Regulatory Affairs. This new position offers a unique opportunity to help design, oversee and monitor the conduct of clinical trials in an entirely new area of research—complementary and alternative medicine. The incumbent will organize the program that insures that these studies adhere to the highest ethical, scientific and regulatory standards.

THE REQUIREMENTS: Candidates must have a doctorate or equivalent in the health sciences and have an established record of leadership in the design, conduct and/or management of clinical trials. Practical experience in bioethics, biostatistics, and familiarity with procedures for investigational drugs and adverse event reporting requirements are extremely desirable. U. S. Citizenship is required. Salary is commensurate with qualifications and experience. Go to <http://nccam.nih.gov/nccam/an/employment/> to see the full announcement and information on how to apply. Send completed applications to:

**National Center for Complementary and Alternative Medicine, NIH
Human Resource Office
Building 31, Room 5B58, 31 Center Drive, MSC 2182
Bethesda, MD 20892-2182**

APPLICATIONS MUST BE POSTMARKED BY JULY 16, 2001.

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MAYO CLINIC SENIOR RESEARCH ASSOCIATE

Mayo Clinic Rochester is recruiting a senior research associate, or research associate, to study the effects of educational interventions on the clinical outcomes of patients. The successful candidate must possess:

- A strong background in qualitative and quantitative methods, psychological and educational theory related to health outcomes research, and health education.
- High-level skills in research design, grant writing, and statistical methods. Enthusiasm for building a research program related to evaluating educational interventions with patients, and in assuming a leadership role in developing research protocols in the Section of Patient Education.
- A Ph.D. in Psychology, Public Health, Health Education, Adult Education or Nursing. Special preference given to applicants with a strong history of scientific writing, independent funding and publication.

Salary will be determined by the successful candidate's experience. There is an attractive benefit package. Mayo Clinic, Rochester is a non-profit physician led clinical practice integrated with education and research in a unified multi-campus system.

Applications including a curriculum vitae and bibliography, a summary of past accomplishments and the names of three references should be sent to:

**Ms. Julie Hathaway
Research Coordinator, Section of Patient Education
Siebens Building Subway
Mayo Clinic
200 First Street SW
Rochester, MN 55905
E:mail: hathaway.julie@mayo.edu Phone: 507/284-4106
Fax: 507/284-9849**

Screening of applicants begins July 1, 2001

*Mayo Foundation is an Affirmative Action and Equal Opportunity
Employer and Educator.*

POSITIONS OPEN

SUBCELLULAR BIOLOGIST POSITION The University of British Columbia

The University of British Columbia is initiating a search for applicants for a 21st Century Chair in cell biology. The 21st Century Chairs have been established by the Canadian federal government with the purpose of attracting and/or retaining outstanding researchers within the Canadian university system. The Chair is for a junior person (**ASSISTANT** or **ASSOCIATE PROFESSOR** level) whose work involves the use of sophisticated light microscopy techniques to study some aspect of subcellular biology such as the role of the cytoskeleton, protein localization, protein trafficking, etc., in immune-related function. The Chair will be a joint appointment between the Department of Microbiology and Immunology and the Department of Zoology. Although our primary interest is for someone who works on some aspect of the immune system such as antigen recognition, phagocytosis, leukocyte adhesion, or migration, individuals working in neurobiology or with model development systems will also be considered. Interested individuals should send curriculum vitae and the names of three references to: **Nancy Kan, Secretary to the Head, Department of Microbiology and Immunology, 300-6174 University Boulevard, Vancouver, British Columbia V6T 1Z3 Canada. E-mail: nkan@interchange.ubc.ca.** The University of British Columbia hires on the basis of merit and is committed to Employment Equity. We encourage all qualified persons to apply. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

DIRECTOR, GENE THERAPY CENTER

Louisiana State University Health Sciences Center at Shreveport seeks a qualified Scientist with a Ph.D., M.D./Ph.D., or M.D. Scientist to lead the expansion of a nascent gene therapy research program that encompasses both basic and clinical research. A new statewide initiative, the Louisiana Gene Therapy Research Consortium, Inc., provides support to participating state academic institutions in a variety of forms including a GMP viral production facility, equipment for shared core laboratories, personnel, and a forum for collaboration between academic Scientists and industry. The applicant will have the opportunity to build a program at LSUHSC-S by recruiting up to three additional faculty members who will interact with existing staff from two basic science and three clinical departments currently engaged in gene therapy research. Faculty appointment will be commensurate with experience at the **ASSOCIATE/FULL PROFESSOR** level in a basic science or clinical department best suited to the applicant's scientific and professional experience. Please send curriculum vitae; statement of research interests; and names, addresses, telephone numbers, and e-mail addresses of three references to:

**John W. Sixbey, M.D.
Department of Microbiology
LSU Health Sciences Center
1501 Kings Highway
Shreveport, LA 71130**

LSU Health Sciences Center at Shreveport is an Equal Opportunity/Affirmative Action Employer.

POSTDOCTORAL POSITION UROLOGIC RESEARCH

Seeking highly motivated individual with Ph.D. and experience in general molecular and cell biology. Basic, transitional, and clinical research using molecular and cell biology approaches and animal models in conjunction with microarray and proteomics technologies is in progress. Position provides strong opportunities for independent Investigators. Salaries are competitive and commensurate with experience. Submit curriculum vitae including three references to: **H-K Lin, Ph.D., Oklahoma University Health Sciences Center—Urology, P.O. Box 26901, Oklahoma City, OK 73190. Telephone: 405-271-6966, Extension 46193.**

POSITIONS OPEN

CENTER DIRECTOR AND PROFESSOR Indian River Research and Education Center University of Florida, Institute of Food and Agricultural Sciences (IFAS)

The Indian River Research and Education Center (IRREC), IFAS, University of Florida, seeks applications for the position of Center Director. The IRREC, located near Ft. Pierce, Florida, conducts research and extension programs on commercial citrus, vegetable, and ornamental crops and provides undergraduate and graduate training related to agriculture and natural resources. The Center includes 17 faculty with expertise in agribusiness, agricultural engineering, entomology, horticultural science, plant pathology, and soil science. Degree programs are offered in agribusiness and horticulture. The IRREC offers exciting opportunities due to a new classroom building and construction of a quarantine facility in 2002. Candidates should have a Ph.D. in an agricultural science or a related field with experience in conducting a major research, extension, or teaching program and academic credentials equivalent for a tenured Professor. The Center Director provides the leadership and vision for developing, promoting, and reporting the multidisciplinary programs of the Center. Applicants must have demonstrated strong professional leadership, communication, interpersonal, and administrative skills. Information about the position and the IRREC may be obtained from the website: <http://irrec.ifas.ufl.edu/>.

Salary is commensurate with experience. Formal review of applications will begin July 15, 2001, and will continue until the position is filled. Candidates should send a letter describing their experience, qualifications, and administrative philosophy relating to this program; a full biographical résumé; and have five persons send letters of reference addressing the applicant's qualifications for the position. Send materials to: **Dr. Walter J. Tabachnick, Search and Screen Committee Chair, Indian River Research and Education Center, University of Florida, 2199 South Rock Road, Fort Pierce, FL 34945. Telephone: 561-468-5668; FAX: 561-468-5668.**

The University of Florida is an Equal Opportunity/Affirmative Action Employer.

RNA AND RIBONUCLEOPROTEIN TRAFFIC

A funded **POSTDOCTORAL POSITION** is available September 1, 2001, to work as part of a four-nation interdisciplinary team (United Kingdom, Germany, Denmark, United States) on a project investigating RNA and ribonucleoprotein molecular dynamics in living eukaryotic cells (with particular emphasis on the nucleus) and combining both state-of-the-art fluorescence microscopy and high-throughput proteomics approaches as well as related biophysical and cell biological methods. Send curriculum vitae and the names and e-mail addresses of two to three references to: **Thoru Pederson, Department of Biochemistry and Molecular Pharmacology, University of Massachusetts Medical School, 377 Plantation Street, Number 337, Worcester, MA 01605.**

POSTDOCTORAL POSITIONS: to study transcriptional regulation of genes involved in lipid biosynthesis and adipocyte differentiation. Research areas include (1) molecular function and regulation of factors (including *pref-1* and *ADSF/resistin*) that control adipocyte differentiation and (2) hormonal/nutritional regulation of lipogenic gene transcription. Send curriculum vitae and names of references to: **Dr. Hei Sook Sul, Department of Nutritional Sciences and Toxicology, 119 Morgan Hall, University of California, Berkeley, CA 94720-3104. FAX: 510-642-0535; e-mail: h.sul@nature.berkeley.edu.**

POSITIONS OPEN

PRINCIPAL SCIENTIST METABOLISM/BIOANALYTICAL

We are currently seeking an individual to join our company as a Principal Scientist in the metabolism and bioanalytical area. This Principal Scientist position will be responsible for the management and technical advancement of a department that performs assays in support of metabolism and solution properties of pharmaceutically relevant compounds.

Major duties and responsibilities of this Principal Scientist position include the following: Serve as a study director for client studies; serve as a scientific resource; participate in technology development; aid in the identification and evaluation of new technologies of interest; collaborate with other laboratory personnel in the development of new technologies; supervise Research Associates; achieve and maintain familiarity with relevant scientific concepts and new information; assist with preparation of SOPs; prepare experimental protocols, data analysis, data summaries, and technical reports; and assist in identifying patentable inventions.

Requirements for this position include a Ph.D. in a relevant scientific discipline, a minimum of 10 years of laboratory experience and a minimum of five years of personnel management experience along with a successful track record in the pharmaceutical industry, academia, or governmental laboratory. Excellent communication and management skills, exceptional analytical skills, a high degree of self-motivation, and ability to work as a proactive team member are required.

Cerep offers a competitive total compensation package as well as a dynamic and collegial work environment. Please send your confidential cover letter and curriculum vitae with salary requirements to the following e-mail address: **n.legresley@cerep.com**. To learn more about Cerep, please visit our website: <http://www.cerep.com>.

Cerep is an Equal Opportunity Employer.

POSTDOCTORAL POSITION available to study metabolic regulation by cAMP via the evolutionarily conserved bicarbonate sensor, soluble adenylyl cyclase (sAC) [see *Science* **289**:625, 2000, or visit website: www-users.med.cornell.edu/llewin/default.html]. Current studies focus on molecular, genetic, and biochemical approaches to understanding the physiological significance of sAC. Applicants should possess a Ph.D. or an M.D. with a strong background in molecular or cellular biology, genetics, or biochemistry. Submit curriculum vitae to: **Drs. Jochen Buck and Lonny R. Levin, Department of Pharmacology, Weill Medical College of Cornell University, 1300 York Avenue, New York, NY 10021. Equal Opportunity Employer.**

POSTDOCTORAL POSITION at University of Maryland School of Medicine, Baltimore, to study endothelial cell biology. Will utilize molecular techniques to study protein-protein interactions and signaling events. Experience with tissue culture, recombinant DNA technology, gene transfer, and protein tyrosine phosphatases desirable. Call **Dr. S. E. Goldblum**; Telephone: **410-605-7182**; FAX résumé and references to: **410-605-7914**; e-mail: **simeon.goldblum@med.va.gov. Equal Opportunity Employer.**

POSTDOCTORAL POSITION MOLECULAR NEUROPHARMACOLOGY

A position is available within the NIH Intramural Research Program for investigating the cellular and molecular characteristics of dopamine receptors. See website: http://intra.ninds.nih.gov/Lab.asp?Org_ID=67 for further information on research. Candidates should have received their Doctorate degree within the past five years and have experience in molecular and/or pharmacological techniques. Please send cover letter and curriculum vitae to: **Dr. David R. Sibley**; e-mail: **sibleyd@ninds.nih.gov**.

MEETINGS



2nd Cold Spring Harbor Meeting on Computational Biology

Integrating Genome Sequence, Sequence Variation & Gene Expression

September 28 - 30, 2001
Abstracts Due: July 3

Organized by:

Aravinda Chakravarti, John Hopkins
Michael Eisen, Lawrence Berkeley N.L.
Michael Zhang, Cold Spring Harbor

Topics include:

- State of the Art in Analysis of Sequence Variation & Gene Expression
- Modelling Global Gene Expression
- Modelling Whole Genome Variation
- Integrating Genomics and Biological Function

Speakers include:

Susan Celniker, Lawrence Berkeley N.L.
Jean-Michel Claverie, CNRS, France
David Cox, Perlegen Sciences
Evan Eichler, Case Western Reserve
Eric Green, NHGRI / NIH
Ira Herskowitz, U.C., San Francisco
Partha Mitra, Bell Laboratories
Gerry Rubin, HHMI / U.C., Berkeley
Eric Siggia, The Rockefeller University
Lincoln Stein, Cold Spring Harbor

Other 2001 CSHL Meetings

- Proteolysis & Biological Control
- Tyrosine Phosphorylation & Cell Signaling
- Retroviruses
- 66th Symposium: The Ribosome
- Yeast Cell Biology
- Eukaryotic mRNA Processing
- Mechanisms of Eukaryotic Transcription
- Eukaryotic DNA Replication
- Microbial Pathogenesis & Host Response
- Programmed Cell Death
- Neurobiology of *Drosophila*
- Molecular Approaches to Vaccine Design
- Physiological Genomics & Rat Models

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phone: 516-367-8346 fax: 516-367-8845
email: meetings@csHL.org
www.cshl.org/meetings

GLOBAL OPPORTUNITIES



BIOMEDICAL SCIENCES INVESTMENTS

The BioMedical Sciences Investments (BMSI) team under EDB Investments Pte Ltd is one of the leading investment groups in Biomedical Sciences in Singapore. EDB Investments Pte Ltd is the investment arm of the Singapore Economic Development Board.

BMSI makes investments in promising private companies and start-ups in the pharmaceutical, biotechnology and healthcare sectors that can potentially make a great impact in facilitating the expansion of the vibrant knowledge-based economy in Singapore. To date, BMSI, with S\$1.21 billion (approximately US\$700 million) under its management, has in its portfolio over 50 companies in USA, Europe and Asia.

We invite high caliber graduates in biosciences, who are seeking challenging careers in private equity investments, to join our dynamic biomedical sciences investment team.

INVESTMENT MANAGERS

You will leverage on our extensive global network to identify technologies and companies in the biomedical sciences that present promising business opportunities for Singapore. Your responsibilities include evaluating and undertaking due diligence, closing investments, as well as monitoring the performance of portfolio companies.

Requirements:

- A MSc/PhD in Biochemistry, Molecular Biology, Genetics or related disciplines.
- Finance or business working experience is preferred but not essential.

If you aspire to be part of the global investment environment, we invite you to join our dynamic team. Positions are available in our offices in USA, Europe and Singapore. Please send a comprehensive resume detailing your academic qualifications (with supporting documents) and working experience via fax to 65.3348478 or by post to:

BioMedical Sciences Investments, EDB Investments Pte Ltd,
250 North Bridge Road, #22-00 Raffles City Tower, Singapore 179101

Closing Date: May 18, 2001

(We regret that only short listed candidates will be notified.)

For more information about Singapore's biomedical sciences industry, Singapore EDB and BioMedical Sciences Investments team, please visit www.bio-singapore.com and www.sedb.com.

COURSES & TRAINING



University at Buffalo
The State University of New York

M.Sc. in PHARMACOMETRICS

A one-year program that emphasizes Pharmacokinetics, Pharmacodynamics and Biostatistics leading to a Master's degree. For individuals with a background in biomedical science and good math and computer skills who seek entry into the high demand and best paying sector of the pharmaceutical industry. **Contact: Director of Graduate Studies, Department of Pharmaceutical Sciences, State University of New York at Buffalo, Buffalo, NY 14260 or Email wjjusko@acsu.buffalo.edu. Information and application forms can be found at our website: Pharmaceutics.buffalo.edu.**

An Equal Opportunity Recruiter.

School of Public Health University of California, Berkeley

Postdoctoral research appointments are occasionally available with individual faculty members in the School of Public Health of the University of California at Berkeley. Appointments are normally made for one year, with the possibility of renewal for a second year. Highly qualified persons may apply for positions to be assumed at the time of, or shortly after, the completion of doctoral studies. A list of current Berkeley School of Public Health faculty and their areas of research interests is available on the World Wide Web. To view this list, access the School of Public Health homepage at <http://sph.berkeley.edu:7047/> refer to the Directory and then to Faculty Profiles for a listing of the School of Public Health faculty. Arrangements should be made for one confidential letter of reference to be sent by the person best able to judge the applicant's research achievements and potential. Applications should include a resume, a brief statement of research experience, interests, and goals, and the names and the addresses of two additional references. The application should be sent directly to the faculty member with whom the applicant prefers to be associated at the following address:

**School of Public Health
University of California
c/o 140 Warren Hall
Berkeley, CA 94720-7360**

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International Society for Cancer Gene Therapy 2001 London Conference

2001 12th & 13th July, The Cumberland Hotel,
Marble Arch, London

Topics include:

- ◆ Viral and non-viral gene delivery systems
- ◆ Immune Gene Therapy
- ◆ Oncogenes & Tumour Suppressors
- ◆ Dendritic & Tumour Cell Vaccination
- ◆ Clinical Trials & Pharmaceutical aspects of cancer gene therapy
- ◆ Breaking news

Confirmed Speakers

Simon Barnes (UK)	Nagy Habib (UK)
Esther Chang (USA)	Joe Harford (USA)
Mary Collins (UK)	Valérie Jérôme (Germany)
Ronald Crystal (USA)	David Kirm (UK)
David Curiel (USA)	Andrew Lever (UK)
Albert Deisseroth (USA)	Leif Lindholm (Sweden)
Jian-jun Dong (USA)	Andrew Miller (UK)
Wafik El-Deiry (USA)	Charles Sherr (USA)
Oleg Eremin (UK)	Robert Sobol (USA)
Farzin Farzaneh (UK)	Pramod Srivastava (USA)
Scott Freeman (USA)	Peter Walden (Germany)
Mariano Garcia-Blanco (USA)	Teresa Whiteside (USA)

**Plus oral presentations from selected posters -
five prizes (£100 to £500)**

**Small number of bursaries available -
contact Conference Secretariat for details**

Scientific Committee: Michael Blaese (USA), Charles Coutelle (UK), Albert Deisseroth (USA), Manfred Dietel (Germany), Farzin Farzaneh (UK), Scott Freeman (USA), Yajun Guo (China), Nagy Habib (UK), Robert Lechler (UK), Hui Kam Man (Singapore), David Klatzmann (France), Andrew Miller (UK), Jim Norris (USA), Kevin Scanlon (USA), Robert Sobol (USA), Peter Walden (Germany).

Abstract deadline for publication in
Cancer Gene Therapy: 21st May 2001

Registration fee: ISCGT Members: £250. Non-members: £325 (up to end May), £375 (after 1st June). Students: £195. 2001 ISCGT Membership: £75, incl. on-line subscription to *Cancer Gene Therapy* 1998-2001 (official journal of the ISCGT)

Registration includes full attendance at conference, book of abstracts, lunches, refreshments, River Thames Cruise/conference dinner (limited to first 230 registrants).

Register online at:

www.iscgt.org/london2001/index.htm or
download Registration Form (Word file) and fax/mail
to Conference Secretariat:

c/o Molecular Medicine Dept, GKT School of
Medicine, King's College London, 123 Coldharbour
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Mechanisms for Cell Growth and Differentiation

October 2-5, 2001

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This symposium will bring together internationally recognized scientists to present and discuss their latest novel basic research findings in the areas of cell growth and differentiation. Understanding both normal and abnormal pathways for cell growth and differentiation is critical to understanding the cellular basis for oncogenesis and for development of new approaches to cancer prevention, detection, diagnosis, and therapy.

For information contact:

Office of Conference Services
Phone: 713.792.2222 Fax: 713.794.1724
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CALL FOR PROPOSALS



ATIGE Programme « Action Thématique Incitative de Genopole »

Call for Proposals

- **Aims:** The present programme, supported by the "Conseil régional d'Ile-de-France", offers an opportunity to scientists at the end of their postdoctoral training to develop an original research project while creating their own group within a public research laboratory located at the genomic campus of Genopole d'Evry.
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The grant of 1.5 M FRF will cover three years. Technical assistance will be provided whenever possible. **Deadline for receipt of applications: June 5, 2001**

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For more details, contact:

Lester S. Gorelic, Ph.D., Cancer Training Branch, National Cancer Institute
301-496-8580 ■ 301-402-4472 (Fax) ■ lg2h@nih.gov
http://rex.nci.nih.gov/wlcm/SCHOLRS_MAIN.html

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CLINICAL SCIENTIST AWARDS IN TRANSLATIONAL RESEARCH

These awards are intended to foster the development, productivity, and mentoring capacity of established physician-scientists who will strengthen translational research—the two-way transfer between work at the laboratory bench and clinical medicine. The awards provide \$750,000 over five years (\$150,000 per year). It is anticipated that up to 10 awards will be made.

Applications must be submitted by degree-granting U.S. or Canadian medical schools on behalf of individual candidates. Candidates from institutions other than medical schools will be considered only if they can demonstrate a plan for coordinating with institutions that provide the patient connection essential for translational research.

Candidates must be U.S. or Canadian citizens or permanent residents, have an M.D. or M.D.-Ph.D. degree, and hold an appointment or joint appointment in a subspecialty of clinical medicine. In exceptional circumstances, non-M.D. candidates will be considered if their work is likely to contribute significantly to the clinical enterprise. Candidates must be established, independent tenure-track investigators at the late assistant professor or the associate professor level (or hold an equivalent tenure-track position).

ADDITIONAL BWF FUNDING OPPORTUNITY FOR BIOMEDICAL SCIENTISTS

Career Awards in the Biomedical Sciences provide \$500,000 over five years to bridge postdoctoral training and initial faculty appointment (application deadline: October 1, 2001).

Complete program information and application forms are available on BWF's Web site at www.bwfund.org

RESEARCH FUNDING
FOR PHYSICIAN-SCIENTISTS

POSITIONS OPEN

NIH-FUNDED POSTDOCTORAL POSITIONS available at the Center for Advanced Research in Biotechnology (CARB) for Biochemists/Molecular Biologists with recent Ph.D.s to join multidisciplinary team investigating molecular basis of ligand recognition by antibodies, T cell receptors (TCRs), and natural killer (NK) cell receptors. Projects include (1) study of antibody specificity by site-directed mutagenesis and phage display; (2) X-ray crystallographic and solution-binding studies of recombinant TCRs, MHC molecules, and superantigens; and (3) structural and binding studies of NK cell receptors. (*Science* 267:1984, 1995; *Nature* 374:739, 1995; *Nature* 384:188, 1996; *J. Exp. Med.* 187:823, 1998; *Biochemistry* 37:7981, 1998; *Nature* 391:502, 1998; *Immunity* 9:807, 1998; *Immunity* 10:473, 1999; *Annu. Rev. Immunol.* 17:435, 1999; *Nature* 402:623, 1999; *Biochemistry* 39:15375, 2000; *J. Mol. Biol.* 304:177, 2000; *Immunity* 14:93, 2001). See website: www.carb.nist.gov/mariuzza.html for further information. Experience in heterologous protein expression in bacterial and/or eukaryotic cells or in BIAcore/sedimentation equilibrium/calorimetry highly desirable. CARB, a joint research center of the National Institute of Standards and Technology and the University of Maryland, is located in the heart of a major biotechnology community that includes TIGR, Celera, and Human Genome Sciences. Excellent opportunities for collaborative studies with Crystallographers and Physical Biochemists. Send curriculum vitae and names of three references via e-mail to: mariuzza@carb.nist.gov or to Dr. Roy Mariuzza, CARB, 9600 Gudelsky Drive, Rockville, MD 20850.

POSTDOCTORAL POSITIONS Johns Hopkins University

Postdoctoral positions will be opening soon for work on one or more problems related to cell energetics and its relationship to molecular medicine. Among these problems are a study of the following: (1) structure/function relationships in the mitochondrial ATP synthase and implications for cancer therapy, (2) structure/function relationships in normal and mutant forms of the CFTR protein and implications for cystic fibrosis therapy, and (3) gene regulation of glycolytic enzymes in cancer. Strongly motivated individuals committed to a career in biomedical research (especially those just completing work for the Ph.D.) can apply by sending a letter indicating which of the above problems they are interested in and why and a copy of their curriculum vitae together with the names of three references to: Dr. Peter L. Pedersen, Department of Biological Chemistry, Johns Hopkins University, School of Medicine, 725 North Wolfe Street, Baltimore, MD 21205-2185. FAX: 410-614-1944; e-mail: ppedersen@welchlink.welch.jhu.edu. An Equal Opportunity Employer.

POSTDOCTORAL OPPORTUNITIES

POSTDOCTORAL POSITIONS available to investigate neurobiological mechanisms related to behavioral state control and cognition using an integrative approach including *in vitro* circuit analysis together with *in vivo* systems and behavioral analyses of inducible and constitutive transgenic animals. Full salary support (NIMH and VA) for experienced candidates with a Ph.D. and/or M.D. is available. Please send curriculum vitae and a statement of research interests to: Dr. Robert Greene, c/o Ms. Lucy Dodd, Department of Psychiatry, The University of Texas Southwestern Medical Center at Dallas, 5323 Harry Hines Boulevard, Dallas, TX 75390-9070. E-mail: lucy.dodd@utsouthwestern.edu.

POSITIONS OPEN

Pintex Pharmaceuticals Inc.

Pintex Pharmaceuticals is an early-stage, privately held life science company focused on the discovery of new cancer diagnostic and therapeutics.

POSTDOCTORAL ASSOCIATE

We are looking for a highly motivated Ph.D. with a strong background in biochemistry or related field with zero to two years of postdoctoral experience. Strong background in enzyme kinetics and protein purification is required. Experience in the development of cell-based and/or biochemical assays is a plus. Candidates should also have excellent communication skills.

The position will initially be focused on the high-throughput screening and kinetic characterization of therapeutic leads.

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The position is immediately available.

Please send your curriculum vitae and names of references to:

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E-mail: humanresources@pintexpharm.com

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POSTDOCTORAL FELLOW VAN ANDEL RESEARCH INSTITUTE

A Postdoctoral position is open to study the regulation of DNA replication initiation in normal and cancer cells. The initiation of DNA replication is under strict regulatory control so that individual origins of replication are activated only once during the cell cycle. Also, DNA damaging agents induce an S-phase checkpoint response that slows DNA replication, prevents late replication origin activation, and inhibits subsequent cell cycle events. We are interested in understanding the molecular mechanism underlying these events since they may be altered during tumorigenesis. Requirements: A Ph.D. in biochemistry, molecular biology, or a related field. Some experience with molecular biology, cell culture, and immunological techniques is useful. Application process: If interested, please send a letter describing your research interests, curriculum vitae, and the names and addresses of three references to:

Dr. Michael Weinreich
Van Andel Research Institute
333 Bostwick Avenue N.E.
Grand Rapids, MI 49503
Telephone: 616-234-5306
FAX: 616-234-5307

E-mail: michael.weinreich@vai.org

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PULMONARY IMMUNOLOGY POSTDOCTORAL POSITION. The successful candidate will work on problems of immune regulation in the lung with emphasis on the role of lung dendritic cells. Studies involve a mouse model of asthma and a mouse model of lung infection and require a basic fund of knowledge of immunology, cell biology, and animal physiology and morphology. The studies are part of a larger Specialized Center of Research (SCOR) on asthma. Minimum requirement: Ph.D. and/or M.D. Preference will be given to candidates with experience working with *in vitro* and *in vivo* cellular immunology systems and flow cytometry. Please send your curriculum vitae, statement of research interest, and the names of three references to: Mary F. Lipscomb, M.D., c/o Marie E. Chestnut, Search Coordinator, UNM-SOM, Pathology, Room 335 BMSB, Albuquerque, NM 87131. E-mail: mchestnut@salud.unm.edu.

POSITIONS OPEN

POSTDOCTORAL SCIENTIST POSITIONS AVAILABLE

Receptor Recognition Mechanisms
University of Pennsylvania

Peptide chemistry/molecular biology: HIV envelope cell receptor interaction and structure-based antagonism.

Protein chemistry/molecular biology: structural mechanism of IL5-receptor subunit recruitment.

Protein chemistry/analytical chemistry/molecular biology: interaction analysis using optical biosensors. Candidates should hold a recently obtained Ph.D. in chemistry, biochemistry, or a related discipline. Positions available immediately.

Application: Send résumés and names/telephone numbers/FAX numbers/e-mail addresses for three references to:

Irwin Chaiken, Ph.D.

Research Professor of Biological Chemistry
in Medicine

Faculty Director of Protein Interactions Core
University of Pennsylvania School of Medicine
909 Stellar Chance Laboratories, 422 Curie Drive
Philadelphia, PA 19104-6100

Telephone: 215-573-9678; FAX: 215-349-5572

E-mail: chaiken@mail.med.upenn.edu

Website: <http://www.med.upenn.edu/imcgroup/>

TELOMERASE RESEARCH

NIH Postdoctoral positions are available to study the structure and mechanisms of telomerase reverse transcriptase. The first position entails the use of X-ray crystallography and other biophysical techniques to obtain atomic resolution structural models of essential domains of telomerase to facilitate the development of inhibitors. A background in biochemistry and/or crystallography is required. The second position entails the use of molecular genetic and biochemical techniques to define the mechanisms and functions of conserved and distinct telomerase motifs. A background in yeast molecular genetics and/or biochemistry is required. For more information, see website: www.med.cornell.edu/microbiology/lue/. Send curriculum vitae and the names of three references to: Dr. Neal Lue, Department of Microbiology and Immunology, Weill Medical College of Cornell University, 1300 York Avenue, Box 62, New York, NY 10021. E-mail: nflue@med.cornell.edu.

POSTDOCTORAL POSITION Harvard Medical School

Postdoctoral positions are available to study the molecular basis of neural development and neurodegeneration. Current investigations employ conditional gene expression and inactivation approaches in mice to address the roles of presenilins and Notch1 in neural development and the involvement of presenilins in Alzheimer's disease. In addition, we have developed parkin knockout mice to investigate the pathogenic mechanism of Parkinson's disease. Highly motivated Ph.D. or M.D./Ph.D. candidates with substantial experience in developmental neurobiology, genetics, or microarray technology are encouraged to apply. Send curriculum vitae, two recent reprints, and three reference letters to: Dr. Jie Shen, 764 HIM, 4 Blackfan Circle, Boston, MA 02115. E-mail: jshen@rics.bwh.harvard.edu.

POSTDOCTORAL POSITION

University of California, NCIRE, and Veterans Affairs Medical Center, San Francisco, have a position available immediately for a qualified individual to join a group studying the molecular and cellular mechanisms by which calcium and vitamin D regulate keratinocyte differentiation. The successful applicant will have a Ph.D. or equivalent in molecular and/or cellular biology. Interest and experience in skin biology is preferred. Send curriculum vitae and three references to: Daniel Bikle, M.D., Ph.D., Department of Medicine, VAMC (111N), 4150 Clement Street, San Francisco, CA 94121. E-mail: doctor@itsa.ucsf.edu.

POSITIONS OPEN

POSTDOCTORAL OPPORTUNITY. The Pacific Northwest Coastal Ecosystem Regional Study (PNCERS) is seeking a creative, enthusiastic, hard-working team player to fill a two-year **POSTDOCTORAL FELLOWSHIP** position designing and testing physical, biological, and socioeconomic indicators of estuarine health and integrity in West Coast estuaries. The successful applicant should have quantitative skills necessary to perform exploratory multivariate analyses, field experience in estuarine and/or coastal systems, a sincere interest (if not experience) in the multidisciplinary approach, and the ability to communicate clearly. Interested candidates should send a letter of interest, curriculum vitae, writing sample of your choice, and names and contact information of three references to: **Julia K. Parrish, SACS Box 355020, University of Washington, Seattle, WA 98195-5020.** Review of applications will begin 25 May 2001 and continue until the job is filled. *The University of Washington is building a culturally diverse faculty and strongly encourages applications from female and minority candidates. The University is an Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION IN SAN DIEGO

Marine Biodiversity and Evolutionary Genetics

A Postdoctoral position is available at the Mitochondrial and Metabolic Disease Center in collaboration with Investigators at the Scripps Institution of Oceanography beginning July 1, 2001, to investigate the mechanisms of transkingdom genetic exchange and to characterize a newly discovered repository of genetic information present in marine ecosystems. This project will combine regular travel to several sites along the California coast with biochemical, molecular, and phylogenetic analysis in the laboratory. Applicants should send their curriculum vitae and names and e-mail addresses of three references to: **Dr. Robert K. Naviaux, M.D., Ph.D., Assistant Professor and Codirector, The Mitochondrial and Metabolic Disease Center (MMDC), University of California San Diego School of Medicine, 214 Dickinson Street, CTF C-103, San Diego, CA 92103-8467.** E-mail: naviaux@ucsd.edu.

PROTEIN NMR POSTDOCTORAL FELLOW

Available immediately: Postdoctoral position to study solution structure and dynamics of receptor domain protein complexes. Candidates should have a background in multidimensional NMR spectroscopy. Excellent facilities including four channel 750 and 600 MHz Varian NMR spectrometers, workstations, and core facilities for molecular biology and protein chemistry are available. Salary commensurate with experience. Please send curriculum vitae and names of contacts to: **Dr. Krishna Rajarathnam, HBCG, 5.138 MRB, Galveston, TX 77555-1055.** E-mail: krishna@hbcg.utmb.edu. *UTMB is an Affirmative Action/Equal Employment Opportunity Employer; Minorities/Females/Veterans/Disabled.*

POSTDOCTORAL POSITION available to study (1) regulation of aflatoxin biosynthesis gene expression in the fungus *Aspergillus parasiticus* and (2) effect of ethylene on aflatoxin biosynthesis and biochemistry of stored grains. Experience in biochemistry, molecular biology, differential display, and protein-protein interactions is desirable. Send or e-mail curriculum vitae and names of three references to: **Dr. J. Linz, Department of Food Science and Human Nutrition, G. M. Trout Building, Michigan State University, East Lansing, MI 48824.** E-mail: linzj@pilot.msu.edu.

Michigan State University is an Affirmative Action/Equal Opportunity Employer.

POSTDOCTORAL FELLOW to participate in the study of the structure and mechanisms of folate-dependent enzymes. Experience in cloning and expression, protein purification, and enzyme kinetics preferred. Send curriculum vitae and references to: **G. Peter Beardsley, Professor of Pediatrics and Pharmacology, Yale University School of Medicine, 333 Cedar Street, 4087 LMP, New Haven, CT 06520-8064.** *Yale is an Equal Opportunity Employer.*

POSITIONS OPEN

Grinnell College **POSTDOCTORAL POSITION** available for a Microbial Geneticist who has a strong interest in undergraduate liberal arts education. The successful candidate will be expected to contribute to teaching and curricular development in biology and biological chemistry while participating in an ongoing research program looking at microbial stress responses with undergraduates. Applicants should submit curriculum vitae, contact information for three references, transcripts, and a statement of teaching and research interests to: **Dr. Leslie A. Gregg-Jolly, Department of Biology, Grinnell College, Grinnell, IA 50112-1690.** In their letters of application, candidates should discuss their interest in teaching and research at an undergraduate liberal arts environment that values diversity and emphasizes close faculty-student interaction. For more information about Grinnell College, please see website: www.grinnell.edu.

Grinnell College is an Equal Opportunity/Affirmative Action Employer committed to employing a highly qualified staff that reflects the diversity of the nation. No applicant shall be discriminated against on the basis of race, national or ethnic origin, age, gender, sexual orientation, marital status, religion, creed, or disability.

POSTDOCTORAL POSITIONS are available immediately to study neural stem cell biology using combined molecular, cellular, and genetic approaches (for general description of our research interest, see *Nature* 409:522-525; *Molecular Cell* 4:883-891; *Cell* 95:225-235; *Current Biology* 9:1247-1251). Although our previous research is focused on using *Drosophila* as a model system to study neural progenitor/stem cells, we equally encourage applications from motivated individuals interested in using knowledge gained in *Drosophila* as starting points to study mammalian neural progenitor/stem cells. You will join a team of energetic and enthusiastic Scientists working in an excellent biomedical research environment. Please send your curriculum vitae and the names of three references to: **Dr. Bingwei Lu, Laboratory of Developmental Neurobiology, The Rockefeller University, 1230 York Avenue, New York, NY 10021-6399;** E-mail: lub@rockvax.rockefeller.edu. *Affirmative Action/Equal Opportunity Employer.*

POSTDOCTORAL POSITION

NIH-funded position available immediately to study hematopoietic stem cell development and plasticity. Applicants should have a strong background in molecular and cellular biology. The project will employ MSCV/lentiviral vectors in investigations of embryonic and adult cell populations. Send curriculum vitae to: **Robert G. Hawley, Ph.D., Head, Hematopoiesis Department, Holland Laboratory, American Red Cross, Reference: HL-018, 15601 Crabbs Branch Way, Rockville, MD 20855.** E-mail: MonicaH@usa.redcross.org. *Equal Opportunity Employer; Minorities/Females/Disabled/Veterans.*

CONFERENCES

FASEB SUMMER RESEARCH CONFERENCE ON TRANSPORT ATPASES: From Genomics to Mechanism

July 14-19, 2001
Snowmass, Colorado
Organizers: Peter L. Pedersen and Giuseppe Inesi

Program focus: (1) Genomics of transport ATPases and (2) structure; mechanism; regulation; and disease relatedness of P, V, F, and ABC transport-type ATPases including Ca^{2+} , $\text{Na}^{+}/\text{K}^{+}$, $\text{H}^{+}/\text{K}^{+}$, H^{+} ATPase/ATP synthase, MDR (P-glycoprotein), MRP1, CFTR; and cholesterol, retinal, copper, and iron-related transporters.

Applications found on website: www.faseb.org/meetings/src.

POSITIONS OPEN

POSTDOCTORAL POSITIONS YEAST MOLECULAR GENETICS

The Wayne State University College of Science, Department of Biological Sciences, has two positions available in an NIH-funded laboratory. The first will elucidate the role of the phospholipid cardiolipin in mitochondrial biogenesis. The second will identify and characterize molecular targets of the antimanic drugs lithium and valproate. Individuals who are highly motivated, interested in utilizing yeast as a model system, and have backgrounds in molecular biology are especially encouraged to apply. Send curriculum vitae and the names of three references to: **Dr. Miriam L. Greenberg, Department of Biological Sciences, Wayne State University, Detroit, MI 48202.** E-mail: mlgreen@sun.science.wayne.edu.

POSTDOCTORAL POSITION to study skeletal and cardiac muscle transcriptional regulation and intracellular signaling. E-mail your curriculum vitae to: **Jeffery D. Molkentin, Ph.D., Children's Hospital, University of Cincinnati, Cincinnati, OH U.S.A.** E-mail: jeff.molkentin@chmcc.org; FAX: 513-636-5958. *Children's Hospital is an Equal Opportunity Institution.*

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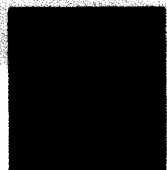
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European Headquarters:
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