

Letter from the Executive Director

The UVA Patent Foundation is proud to serve the University of Virginia in many significant ways. To us, our most important role is to provide professional support services to the UVA faculty. Although those on the outside might think faculty simply “pass the baton” to us when they disclose their inventions, this is not the case at all. To the contrary, we actively encourage faculty to stay involved in determining the fate of their inventions. We are here to apply our business-world skills and experience to support faculty who want their research findings to result in new products and services that can help people. Active collaboration between the Patent Foundation and UVA faculty inventors is the heart of what we are all about, and it is the source of all of our success.

We similarly serve the interests of Federal research funding agencies, which rely on us to bring research benefits to the taxpayers who support academic research. In recognition of this important role, the Patent Foundation operates with a strong emphasis on deal flow. The greater the number of license and option deals we can complete with industry, the greater the number of UVA technologies that have a chance of reaching commercialization. We are pleased to report that our efforts resulted in the completion of 51 deals in 2001. During the period from 1997 to 2001, we have completed over 130 deals. Since there is usually a lag of about 7 years before new technologies reach the marketplace, we hope to see an increasing number of UVA technologies reach the marketplace over the next few years.

Perhaps our most visible role is to generate revenues that can serve as incentives for faculty inventors, and can financially support further UVA research. We were very successful on this front in fiscal 2001, earning \$7.5 million in royalties. From this income, we provided nearly \$2 million in incentive compensation to faculty inventors, and over \$2.7 million to UVA for the support of research, while at the same time continuing to be fully self-supporting. We are pleased to note that the Patent Foundation has earned over \$53 million since 1978, and has provided \$25 million to support further UVA research.

The Patent Foundation is a part of what today has become a substantial industry. Over 13,000 invention disclosures were processed by university licensing offices in 2000, over 6,300 new U.S. patent applications were filed, and over 4,300 new license and option agreements were signed. University licensing income reached \$1,620,000,000 in 2000, exceeding a billion dollars for the first time. Based on this nation-wide success, we believe that with continued emphasis on deal flow, the Patent Foundation can hope for even greater financial success in the future.

The frontier for university technology transfer programs is to use faculty inventions to create brand new companies. Over 450 new companies were launched by American universities in 2000. The Patent Foundation has made a conscious decision to join this movement, and in 2000 formed a new subsidiary, Spinner Technologies, Inc., to actively encourage and support UVA faculty entrepreneurs. Spinner is now advising faculty entrepreneurs, providing affordable corporate lab and office space, and assisting young companies in making business decisions and finding resources. At the same time, the Patent Foundation continues to give licensing preference to faculty start-ups. We completed 25 licenses with faculty start-ups in 2001, for a total of over 60 such licenses since 1997. This new level of faculty support is a perfect fit with our overall faculty service mission, and we hope that it will eventually lead to the creation of a broader Charlottesville technology economy, and strongly contribute to the success of the University research parks.

These and other important roles we play at UVA are further described in this fourth Annual Report. We hope that this Report will help you to share our vision, and share our enthusiasm that we can be of increasing value to the UVA community in the future.

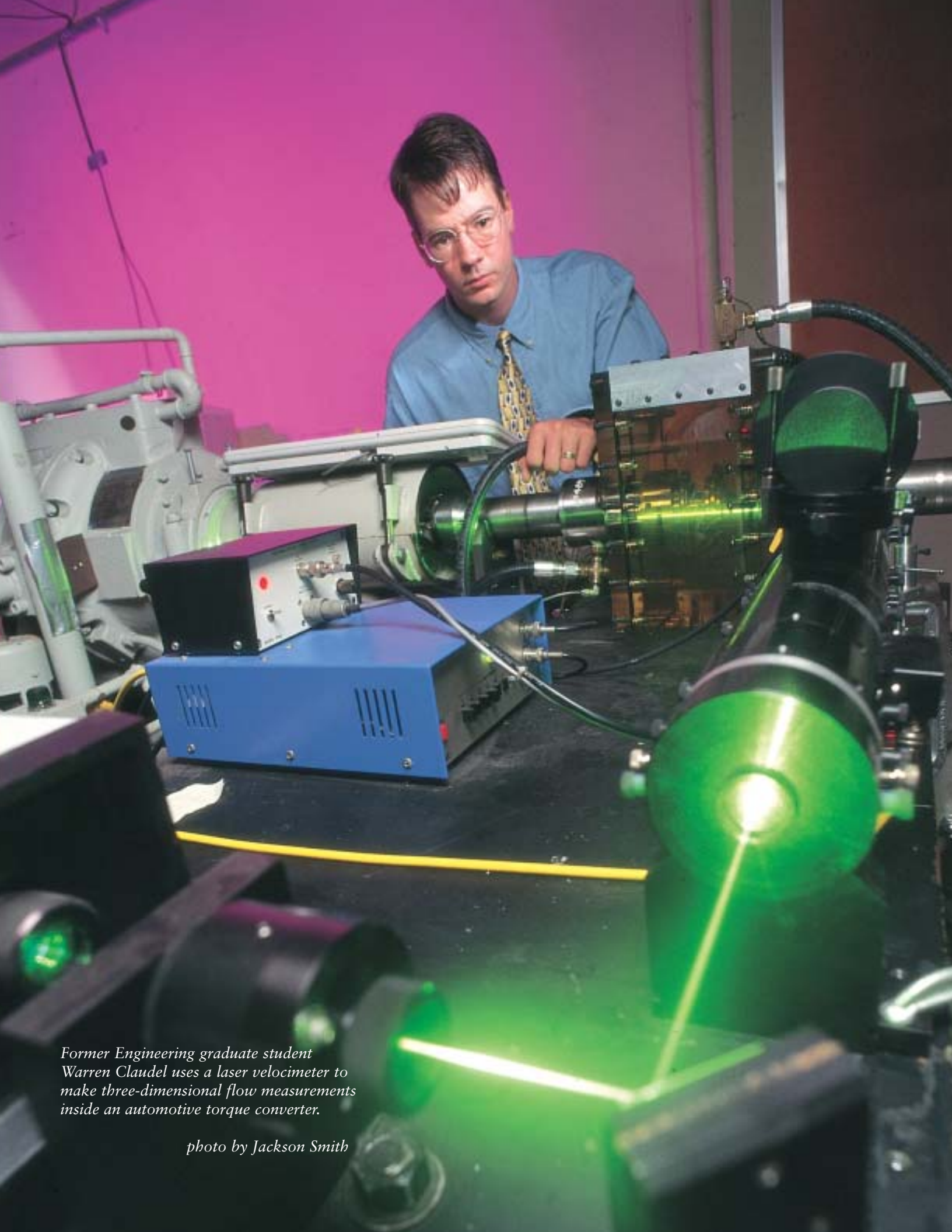


photo by Erin Garvey

Sincerely,

A handwritten signature in black ink, appearing to read "Bob". The signature is fluid and cursive, with a long horizontal stroke at the end.

Robert MacWright



Former Engineering graduate student Warren Claudel uses a laser velocimeter to make three-dimensional flow measurements inside an automotive torque converter.

photo by Jackson Smith

Technology Transfer at the University of Virginia

Fiscal 2001 was a record-setting year for the Patent Foundation. In addition to completing 51 deals, the Patent Foundation also generated a record-setting \$7.5 million in licensing fees and royalties, which was shared with UVA and the inventors according to the UVA Patent Policy. The number of inventions disclosed to the Patent Foundation rose to 134 from last year's total of 124, and the Patent Foundation filed 119 provisional patent applications on these inventions. The School of Medicine continues to provide the majority of UVA's disclosures, but the School of Engineering and the College of Arts & Sciences contribute a large number of valuable disclosures as well.

The Patent Foundation is pleased to report that cumulative licensing revenues in the 2001 Fiscal Year brought total revenues to over \$53 million since the Patent Foundation was formed in 1978. Of this total, \$25 million has been distributed to UVA to support additional research and other scholarly activities, and \$10 million has been distributed to the UVA inventors as personal income.

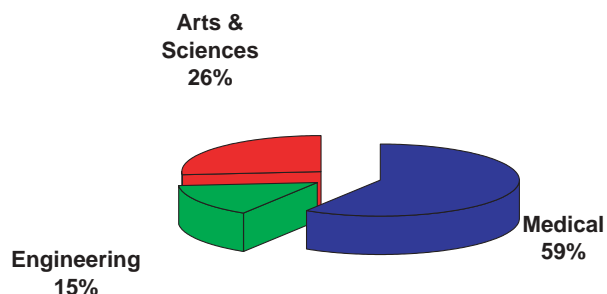
To better meet the needs of UVA faculty and staff, the Patent Foundation hired two new licensing associates in FY 01. In keeping with our view that scientific understanding is essential to technology evaluation and marketing, both new associates have doctorates, one in Pharmacology and the other in Physics.

New company start-up activity continues to be important to the Patent Foundation's overall licensing strategy. The Patent Foundation signed 25 deals with new and existing faculty-owned companies in 2001, more than ever before. In addition, seven new start-ups were formed in 2001 based on UVA technology licensed from the Patent Foundation. This level of activity was stimulated in part by Spinner Technologies, Inc., a for-profit subsidiary of the Patent Foundation, which provides support services to participating faculty start-up ventures.

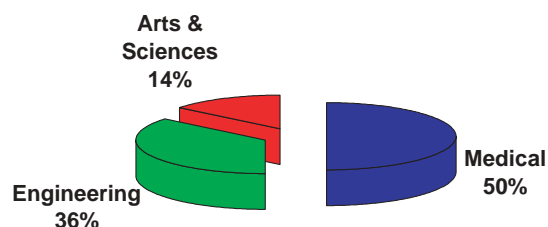
The Patent Foundation's continuing investment in Spinner Technologies allows Spinner to advise and assist in the conceptualization and planning for new technology businesses, provide low-cost laboratory and office space, refer companies to qualified management candidates, attorneys and potential investors, and provide informed guidance in the preparation of business plans and SBIR and STTR grant applications. The scope of Spinner's services will continue to grow as it succeeds in securing additional resources.

The Patent Foundation continues to serve UVA in a variety of ways, including educating students on patent and licensing issues. Some of these educational activities include the Patent and Licensing Law Clinic that the Patent Foundation teaches at the UVA School of Law, our James Wray Summer Law Internship, and our Graduate Internship program. Programs such as these have helped prepare students for careers that involve the academic, business and legal issues surrounding intellectual property, while at the same time providing enhanced services to the UVA faculty.

New Inventions in FY 2001



New Start-up Companies in FY 2001



INVENTIONS

Invention Disclosures.....134

PATENTS

U.S. Provisional Applications Filed119

Regular U.S. Applications Filed*60

PCT Applications Filed.....32

U.S. Patents Issued.....22

DEALS

Option Agreements.....7

License Agreements.....41

Inter-Institutional Agreements.....3

Total Deals.....51

The numbers reported in this table were tabulated with the assistance of Hantzmon, Wiebel & Company, Certified Public Accountants.

*Includes U.S. designations in PCT applications.

The Patent Foundation also strives to educate faculty on the nuances of intellectual property and technology transfer, through patent and licensing seminars in individual academic departments. Of course, many faculty inventors learn from the Patent Foundation staff one-on-one, throughout the patenting and licensing processes.

By educating students and faculty on intellectual property issues, the Patent Foundation hopes to create an environment at UVA that is more conducive to the creation, protection, and commercialization of ideas.

The Patent Foundation staff has enjoyed opportunities to participate in national and regional intellectual property and economic development conferences as invited speakers, and to participate in local community organizations. Executive Director MacWright was named the Chairman of the Charlottesville Venture Group in 2001. Other Patent Foundation employees remain active in the local community by volunteering for organizations key to the development of a technology economy in Charlottesville, including participating as board members of the Virginia Piedmont Technology Council, the Academic Licensing Community of Virginia, and the UVA start-up companies Directed Vapor Technologies International and Cellular Materials International.

The Patent Foundation is also taking strides towards expanding internationally, as evidenced by the recent marketing agreement with Project Frontier Japan (see page 6). This relationship provides an opportunity to more effectively market technologies in Japan and throughout Asia while also providing a potential influx of new technology to these regions to stimulate the growth of new industry.

ABOUT THE FIGURES:

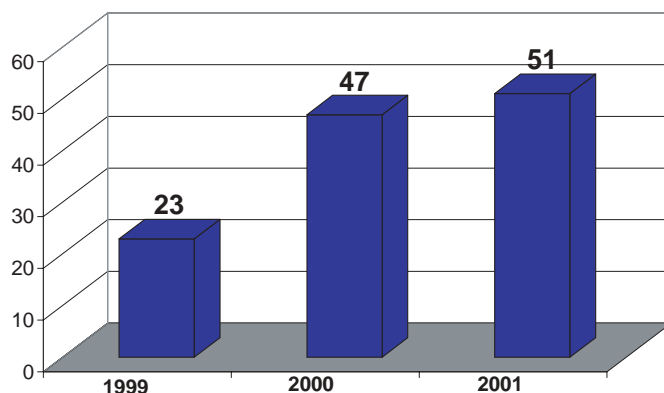
In the first figure, a deal is a contractual transfer of technology from the Patent Foundation to a company. One deal could transfer one or many technologies.

In the second figure, a start-up is formed around a UVA technology when the company is created for the purpose of commercializing that technology; thus each start-up is counted once, regardless of how many technologies it licensed from the Patent Foundation.

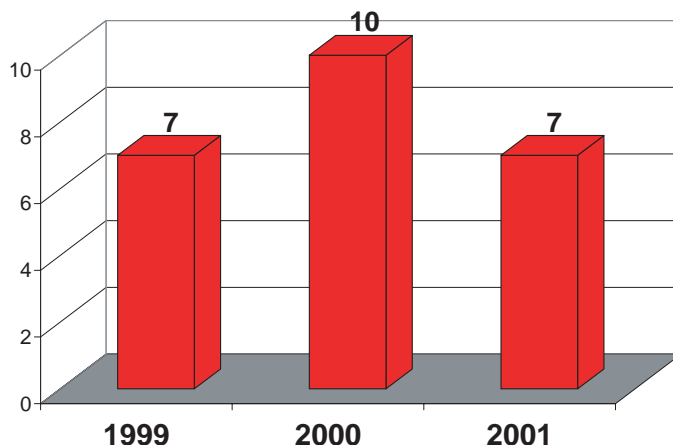
The third figure represents those deals that led to the creation of a start-up, deals with start-up companies that were not initially formed around UVA technology, and deals with existing UVA start-ups for additional technologies.

In subsequent sections, these figures are presented for each of the schools of the university. Because UVA is rich in collaborations among faculty in different schools, a single deal may cover technology invented by faculty from multiple schools, and faculty from multiple schools may join together to form a start-up company. The figures for each school represent deals and start-ups in which at least one member of the school participated; the same deal or start-up may be included in a figure for another school if one of its faculty members participated as well. Likewise, a technology invented by a faculty member with a joint appointment in different schools would be represented in the figures for both schools.

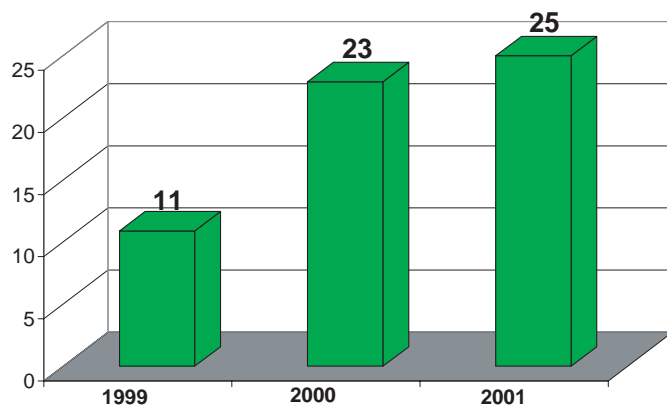
Total Deals Signed



Start-up Companies Formed



Deals with Start-ups



How a UVA Invention Becomes a Licensed Patent

Step 1: Invention Disclosure

When a UVA inventor conceives an idea, the inventor informs the Patent Foundation by submitting an invention disclosure. The invention disclosure provides a written description of the technology and an explanation of how the technology differs from other existing technologies. The invention disclosure form, and the instructions for completing it, can be found on the Patent Foundation website (www.uvapf.org). As soon as the invention disclosure is submitted to the Patent Foundation, it is assigned to one of several licensing associates, based upon their technological field of expertise.

Step 2: Triage

The assigned licensing associate analyzes the invention disclosure to determine the probability of success in obtaining patents on the invention, and to estimate the invention's commercial potential. The invention is first reviewed for the requirements for patentability, which include utility, novelty and non-obviousness. A patent search and a literature search are also conducted to determine whether there is prior art that would bar or decrease the likelihood of obtaining a patent, or unduly limit the patent's scope. To estimate the commercial potential of the invention, the licensing associate evaluates whether the invention has been reduced to practice, whether there is a niche in the marketplace for the product, and whether there are specific companies that can be identified as potential licensees for the invention.

Step 3: Protecting the Invention

Once the licensing associate has determined that the invention is likely to be patentable and has significant commercial potential, one of the Patent Foundation's patent attorneys prepares and files a provisional patent application in the U.S. Patent and Trademark Office. As required by law, the application describes the invention in sufficient detail to enable persons of ordinary skill in the art to make and use the invention, and describes the best mode of practicing the invention. The filing of such an application is inexpensive, yet has considerable value; it allows the faculty to publish their research findings without jeopardizing potential patent rights, provides the licensing staff with up to a year to market the invention, and gives us a "foot in the door" that may provide priority over others who later file patent applications covering the same subject matter. Before the one-year life of the provisional application ends, if a licensee is identified and/or the invention is found to have strong market potential, the Patent Foundation's patent attorney will draft a regular patent application, and/or an international patent application, and submit it to the U.S. Patent and Trademark Office and/or to an international Receiving Office.

Step 4: Marketing and Licensing

The licensing staff first carries out market research in order to identify and rank several companies who have potential market interest in the invention. For example, they may have other products that are in the same market area, or the new invention may appear to be a logical extension of a current product line. The licensing associate then contacts the licensing executives at those companies and provides them with non-confidential information about the invention. This initial communication requires considerable skill, as positioning, persuasion and salesmanship are needed to put the technology into the best possible light. Hopefully, one or more licensing executive expresses an interest in learning more about the invention, in which case the associate invites him or her to sign a Confidential Disclosure Agreement so that they may discuss the invention and a potential license agreement in detail.

If continued encouragement by the licensing associate leads the company to decide to take a license, then the negotiation process begins. The first step is often to enter into an option contract. In an option contract, the Patent Foundation agrees to discontinue marketing the invention to others for a specified period of time, while the potential licensee further evaluates the invention and determines whether it wants to take a license to the technology. In exchange, the company pays an option fee, and also covers certain patenting costs.

Once the company exercises its option, a license is negotiated. Under such an agreement, the Patent Foundation permits the company to enjoy some or all of the legal rights to practice the invention, and in exchange, the company agrees to diligently commercialize the technology and to pay a royalty.

Step 5: Monitoring Performance and Collecting Royalties

Because university inventions are usually at a very early stage of development, the marketing of licensed products generally takes five to seven years - and even longer if FDA approval is required, e.g. for new drugs. During this time, the Patent Foundation's Business Department actively monitors the company's commercialization efforts, to make sure that the technology is not "put on the shelf." They also monitor financial performance, and make sure that the company pays royalties and other fees as they are due. When such payments are received, the Business Department shares the proceeds with the inventors and UVA, in accordance with the UVA Patent Policy (see page 28).



Patent Foundation Marketing Partner Opens Office in Kobe, Japan

In May of 2001, the Patent Foundation entered into a marketing agreement with the Japanese firm Project Frontier Japan Corporation (PFJ), an organization formed in conjunction with the city of Kobe to market UVA inventions in Japan. As part of the agreement, a Patent Foundation affiliated licensing office has been set up in Kobe next door to the RIKEN Center for Developmental Biology, a new institution founded to carry out research in biodifferentiation, tissue engineering and stem cell research.

The Patent Foundation provides PFJ with non-confidential summaries of UVA inventions, primarily focused in the biotech and medical device fields, for PFJ to share with technology-based businesses in the Kobe region and throughout Japan. The Patent Foundation also shares confidential information with PFJ as needed. PFJ works to identify Japanese companies that may have an interest in one or more UVA inventions, and explores with them potential commercial applications for such inventions. The Patent Foundation follows up on any leads that result from PFJ's marketing efforts, and, if significant interest exists, negotiates a license agreement with the interested Japanese company. Depending on the size, resources and interests of the Japanese company, the license to UVA technology may be an international license, or may be limited to Japan.

Though this marketing partnership is still in the development phase, PFJ is already marketing approximately one hundred UVA inventions, and such efforts have generated a number of important licensing leads. In addition, PFJ is exploring the possibility of expanding their marketing efforts for UVA inventions into Korea and China.

"We live in a global world, and can market UVA products to large multi-national companies almost as easily as we can market to modest-sized companies in the United States," says CEO and Executive Director Bob MacWright. "But marketing to modest-sized companies in a particular country, such as Japan, can be difficult because we may not be sensitive to the cultural environment or speak the language. Having an office in Kobe with a Japanese staff will allow us to showcase UVA technology to companies of all sizes in Japan. It also will make it easier to connect with multi-national companies headquartered in Japan."

The idea for this collaboration began when Kobe city officials decided to build a biotechnology-based economy in the region, and postulated that developing a relationship with a U.S. university in connection with Kobe's new research park would create new business opportunities. Kobe government officials first visited Charlottesville in May 2000 to explore potential areas of cooperation. These officials showed particular interest in opportunities for intellectual property transfer through the Patent Foundation, and proposed the establishment of a Patent Foundation affiliate office in a Kobe industrial park.

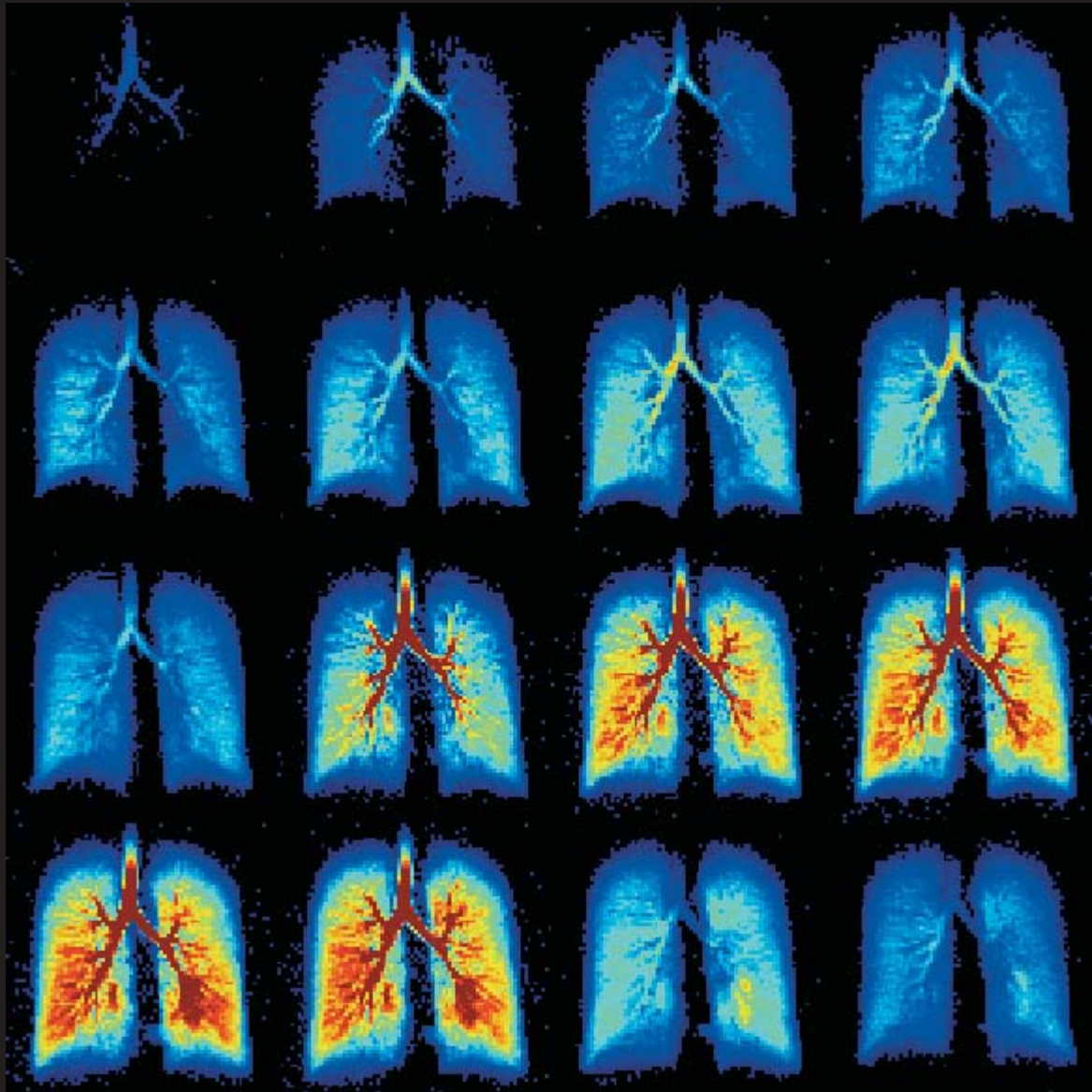
While U.S. universities often spin out intellectual property into faculty start-up companies in order to create local economic development opportunities, that is not a common approach for most Japanese universities. So, there was considerable interest in experimenting with the U.S. model, by encouraging the licensing of UVA technology to small businesses, and striving to rejuvenate Kobe's economy by nurturing the growth of these companies.

Although this marketing relationship with PFJ is just beginning, we are excited about the potential it has to open up Asian markets to our technology. This is thought to be one of the first such international partnerships, and we are proud to be part of this unique opportunity.

Patents Issued in Fiscal Year 2001

U.S. Patent Number*	Title	Inventor(s)
6,082,364	Pluripotential bone marrow cell line and methods of using the same	Gary Balian, Gwo-Jang Wang, David Diduch, Chang Hahn
6,093,697	Synthetic insulin mimetic substances	Joseph Larner, John Price, Thomas Piccariello, Laura Huang
6,096,021	Flow-arrest double balloon technique for occluding aneurysms or blood vessels	Gregory Helm, David Kallmes, Gerald Hankins
6,099,821	Nuclear scintigraphic assessment of mucosal function	Tyvin Rich, Alexander Kirichenko
6,101,886	Multi-stage sampler concentrator	Jack Brenizer, Charles Daitch, Bouvard Hosticka, Roger Mason Jr., Pamela Norris
6,117,878	8-phenyl- or 8-cycloalkyl xanthine antagonists of A2B human adenosine receptors	Joel Linden
6,117,889	7-Azabicyclo-[2,2,1]-heptane and -heptene derivatives as analgesics and anti-inflammatory agents	Tsung-ying Shen, Dean Harman, Dao Fei Huang, Javier Gonzalez
6,136,785	Protection from loss of sensory hair cells in the inner ear by administration of insulin-like growth factor and platelet-derived growth factor	Jeffrey Corwin, Eugenia Gray, Mark Warchol, Linda Saffer
6,139,734	Apparatus for structural characterization of biological moieties through HPLC separation	Robert Settlege, Donald Hunt, Robert Christian
6,152,563	Eye -gaze direction tracker	Thomas Hutchinson, Christopher Lankford, Peter Shannon
6,154,826	Method and device for maximizing memory system bandwidth by accessing data in a dynamically determined order	William Wulf, Sally McKee, Robert Klenke, Andrew Schwab, Stephen Moyer, James Aylor, Charles Hitchcock
6,159,467	<i>In vivo</i> suppression of osteosarcoma pulmonary metastasis with intravenous osteocalcin promoter-based toxic gene therapy	Leland Chung, Chinghai Kao, Robert Sikes, Song-Chu Ko, Jun Cheon
6,162,472	Nutritional formula for premature infants and method of making	M. Pamela Griffin
6,165,469	Recombinant <i>Entamoeba Histolytica</i> lectin subunit peptides and reagents specific for members of the 170 kD subunit multigene family	Barbara Mann, William Petri
6,181,980	Biopsy marker device	Mary Jensen, Laurie Fajardo
6,187,310	Recombinant <i>Entamoeba Histolytica</i> lectin subunit peptides and reagents specific for members of the 170 kD subunit multigene family [divisional of 6,165,469]	Barbara Mann, William Petri
6,192,320	Interactive remote sample analysis system	Keith Margrey, Robin Felder, James Boyd, William Holman, John Savory
6,216,030	Magnetic stereotactic system for treatment delivery	Matthew Howard, Marc Mayberg, Sean Grady, Rogers Ritter, George Gillies
6,216,032	Method and apparatus for the early diagnosis of subacute, potentially catastrophic illness	M. Pamela Griffin, J. Randall Moorman
6,232,297	Methods and compositions for treating inflammatory response	Joel Linden, Gail Sullivan, Ian Sarembock, Timothy Macdonald, Mark Okusa
6,245,440	Continuous metal fiber brushes	Doris Kuhlmann-Wilsdorf, David Makel, George Gillies
6,245,938	4-pentenoyl groups for derivatization and protection of amino acids	Sidney Hecht, Michiel Lodder

*To view these patents, log onto the U.S. Patent and Trademark Office database at <http://www.uspto.gov>, click on "Patents", then "Search Patents" and enter the patent number in the search block.



Series of images obtained by MRI of a subject inhaling and exhaling hyperpolarized helium-3 gas. The Patent Foundation has patented the process by which these images were produced.

Image compliments of John P. Mugler III and the UVA Radiology Dept.

School of Medicine

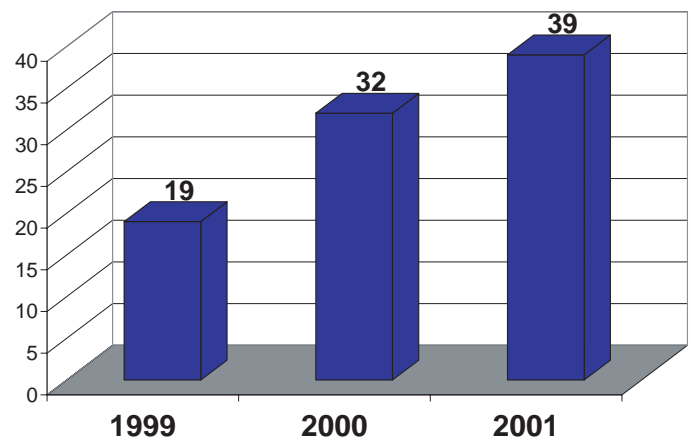
In FY 2001, the Patent Foundation received 84 invention disclosures from faculty at the UVA School of Medicine. During this period, the Patent Foundation signed 39 licensing contracts for medical inventions. The up-front licensing fees for these deals totaled almost \$200,000, nearly half of which was shared with the inventors in accordance with the UVA Patent Policy.

Inventions and discoveries at the School of Medicine have contributed significantly to economical development in the Charlottesville region. Of the 39 transactions completed in FY 2001 regarding School of Medicine inventions, 17 were to UVA faculty start-up companies. Most of these companies, including Yabko, LLC, Respiratory Research, Inc., ContraVac, Inc., Cottler Technologies, LLC, Pinnacle Pharmaceuticals, Inc., Alglutamine, LLC, and Adenosine Therapeutics, LLC, were founded for the sole purpose of commercializing medical technologies developed at UVA, and are located in the Charlottesville region. Importantly, most of the faculty start-up companies to whom we have licensed technology fund continuing research in the UVA laboratories where the inventions were made. The presence of these companies will bolster economic growth in the region by providing employment and by attracting other high-tech companies to the area, which in turn should help further increase corporate research sponsorship.

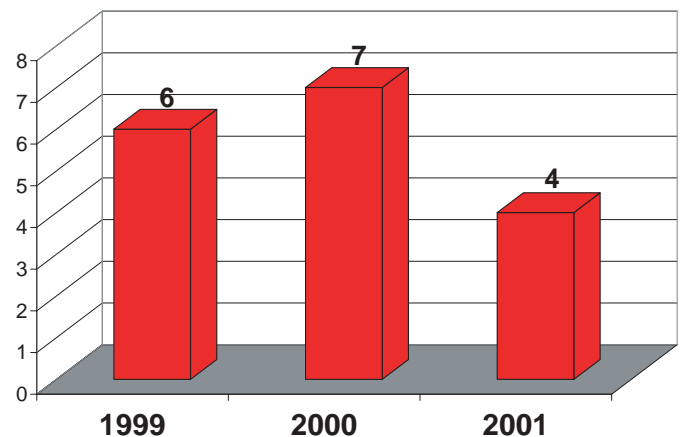
Examples of Licensed Medical School Inventions

One Medical School invention licensed in FY 2001 centers around the prediction of hypoglycemic shock in diabetics. Daniel Cox and Boris Kovatchev of the Department of Psychiatric Medicine have developed a data analysis method for monitoring HbA1c hemoglobin, which is an indicator of long-term elevated glucose levels, and also for monitoring short-term blood glucose levels. This data analysis method is able to predict the onset of hypoglycemic shock in diabetics long before any physical symptoms can be observed. The Patent Foundation licensed

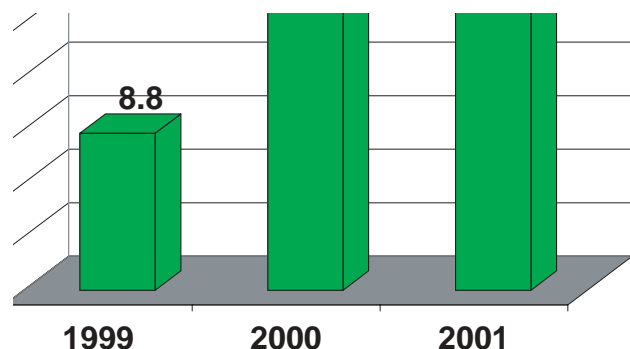
Medical School Deals



Medical School Start-ups Formed

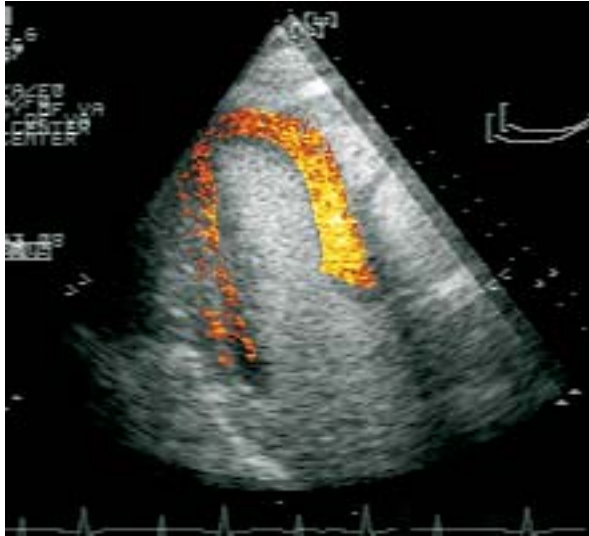


Deals with Medical School Start-ups



the patent rights to this method to LifeScan, Inc., a division of Johnson & Johnson. In addition to entering into this license agreement, LifeScan has agreed to fund additional research at UVA to refine

Image compliments of Jiri Sklenar and UVA Cardiovascular Imaging Center



Contrast enhanced image of blood flow in the heart. This image was produced by software developed by Jiri Sklenar in the Cardiovascular Imaging Center.

the method. The Patent Foundation is confident that this new relationship between UVA and LifeScan will result in better methods of glucose monitoring for diabetic patients.

Another Medical School technology licensed by the Patent Foundation in FY 2001 is a significant advancement in cardiac imaging. Jiri Sklenar, a research scientist in the Cardiovascular Imaging Center, has developed software for the processing of ultrasound images generated by myocardial contrast echocardiography. Dr. Sklenar has formed a start-up company, Yabko, LLC, to develop the software, and Yabko has licensed the rights to the software from the Patent Foundation. Yabko plans to create a clinical version of the software that can be used by cardiologists in doctor's offices and hospitals around the world. The Patent Foundation's subsidiary company, Spinner Technologies, Inc., (see page 20) is providing Yabko with assistance in developing its business.

Ben Gaston and John Hunt of the Department of Pediatrics have made a number of inventions aimed at improving methods for treating asthma. About one in 13 school-aged children have this chronic breathing disorder, and asthma accounts for one-third of all pediatric emergency room visits. Drs. Gaston and Hunt regularly treat asthmatics in their clinical practice, and have been investigating airway pH changes in asthmatics and how such changes might be used to monitor and treat asthma. One of their inventions, a pH monitor that can predict the onset and severity of asthma attacks, has been licensed by the Patent Foundation to Dr. Hunt's start-up company, Respiratory Research.

Adenosine in the Treatment of Supraventricular Tachycardia

Patent No. 4,673,563 (1987)

Robert Berne, Luiz Belardinelli and Rafael Rubio
Licensed to Medco, Inc. (Now King Pharmaceuticals)
Sublicensed to Fujisawa Healthcare

This patent, which covers methods for using adenosine to treat heart arrhythmias, represents one of the most significant scientific discoveries to result from UVA research since the Patent Foundation was formed. A product known as Adenocard® is approved by the U.S. Food and Drug Administration for use in our patented methods, and is marketed throughout the world by Fujisawa Healthcare. Adenocard®, used as an emergency treatment for life-threatening heart arrhythmias, has saved countless lives. The figure shown is an electrocardiogram from an experiment that led to the discovery of adenosine's therapeutic value.

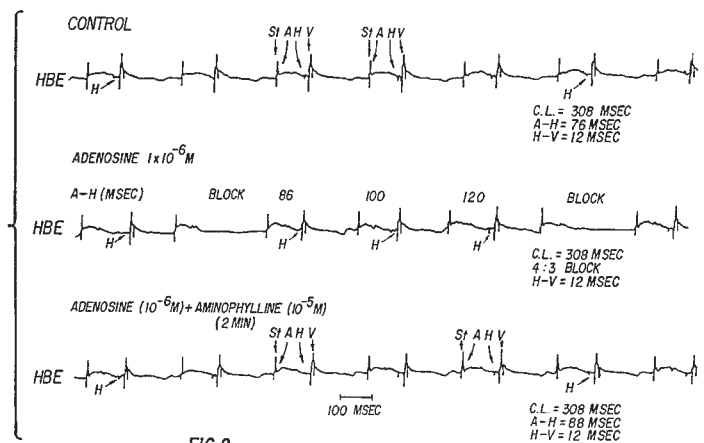


FIG. 2

Licensing of Research Tools

Technology license negotiations can be complex, and usually take several months to complete. The resulting “transaction costs” can sometimes make small-market technologies unattractive to licensees. The most common small-market technologies are research tools and reagents, such as antibodies and enzymes.

Although they are not big money makers, licensing of research tools and reagents is important, as availability of these tools and reagents facilitates academic research and scientific progress. The National Institutes of Health have taken a strong stance in favor of such licensing, as set out in the recently-released “NIH Principles and Guidelines for Sharing Biomedical Research Resources.” Licensing such tools and reagents is also important from a faculty service perspective.

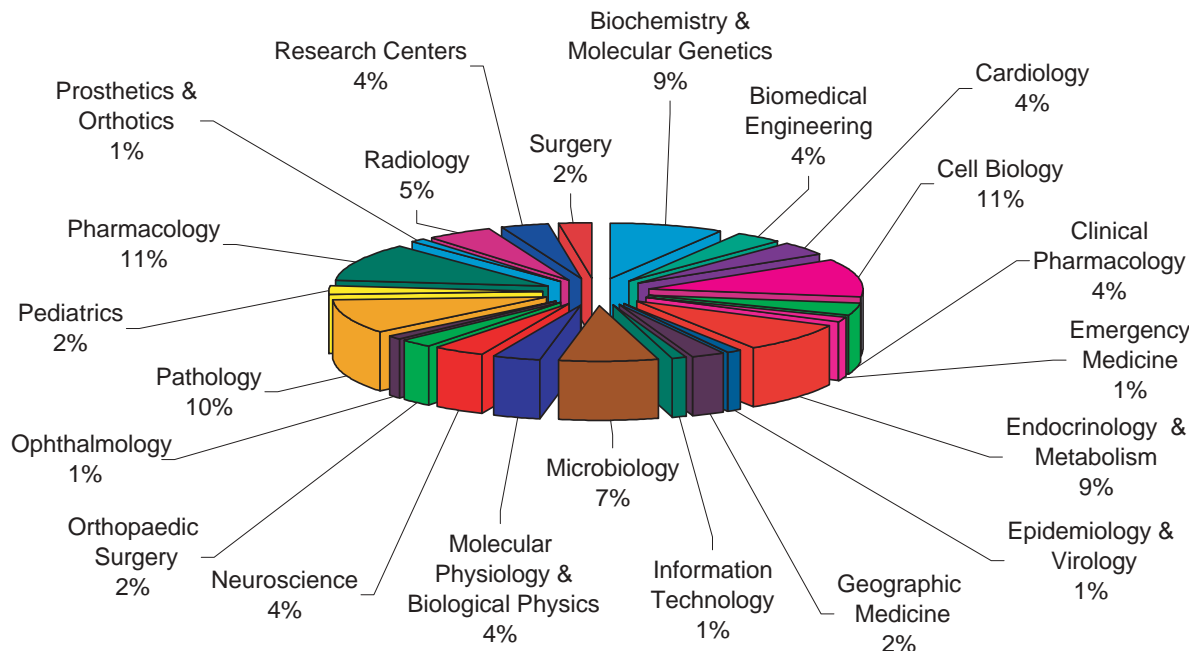
In order to reduce transaction costs, the Patent Foundation has crafted a Master Reagent License Agreement which we have now successfully executed with several reagent and antibody companies. These agreements contain general licensing terms and conditions that are applied to all future antibody and reagent deals with these companies.

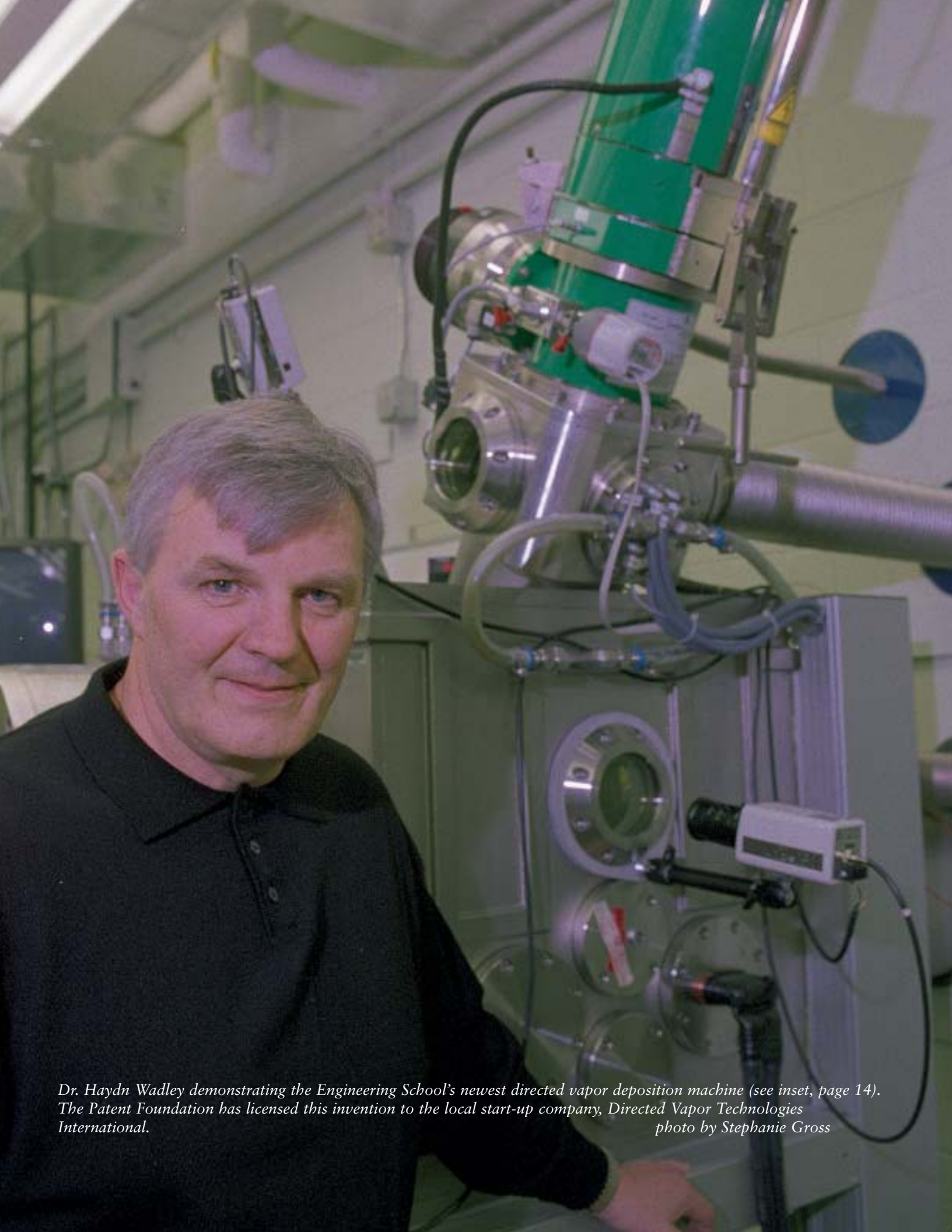
If a company with which we have such an agreement wishes to license a new research tool or reagent, we simply negotiate financial terms and execute a two-page individual license for those specific materials, relying on the Master Agreement for the more general terms and conditions. As a result, terms for an individual reagent can now be negotiated in days instead of months. Use of the Master Agreement has decreased transaction costs for all parties involved, and helps our licensees bring products to market more quickly.

The Patent Foundation currently has Master Reagent Agreements in place with Upstate Biotechnology, Inc., Santa Cruz Biotechnology, Inc., Sigma Chemical, Inc., BD Biosciences Pharmingen, Inc., and Morwell Diagnostics, GmbH. We encourage faculty members to disclose research tools to us so that we may pursue licensing opportunities with these and other companies. Such licenses will displace the burden of producing and shipping reagents from the faculty members’ laboratories, and in turn, result in modest royalties for the researchers and for UVA.

Note: Please see our new simple-to-fill-out Reagent Disclosure Form, appropriate for disclosing research tools for which patent protection is most likely unnecessary. The Reagent Disclosure Form is available from our website (www.uvapf.org) under the “Forms” link.

Medical Disclosures by Department





Dr. Haydn Wadley demonstrating the Engineering School's newest directed vapor deposition machine (see inset, page 14). The Patent Foundation has licensed this invention to the local start-up company, Directed Vapor Technologies International.

photo by Stephanie Gross

School of Engineering and Applied Science

Inventions and software from the School of Engineering and Applied Science continued to show great promise in FY 2001, producing 20 new disclosures, eight deals and four issued patents. Financial results were outstanding too, as up-front license fees exceeded \$1.5 million. Nearly 50% of this money was distributed directly to UVA authors and inventors. Corporate research funding to the School of Engineering also increased by 20% to almost \$36 million. This funding increase may lead to a rise in new inventions in the coming years.

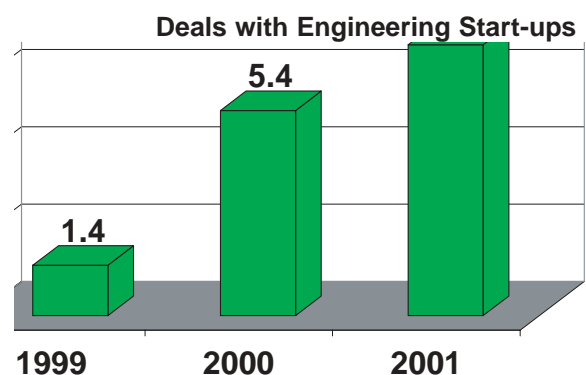
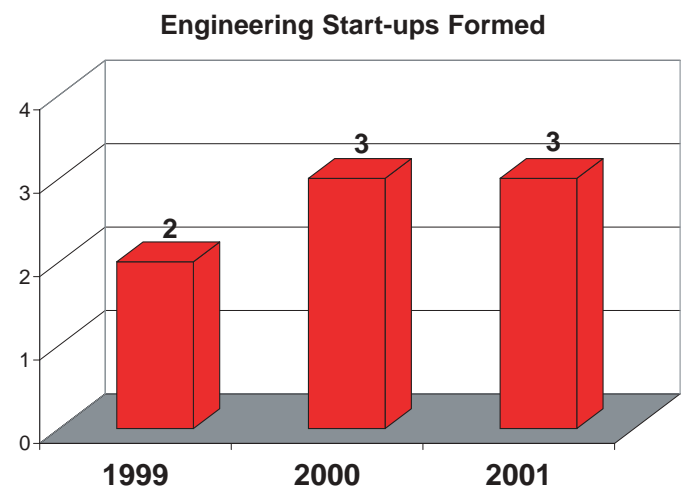
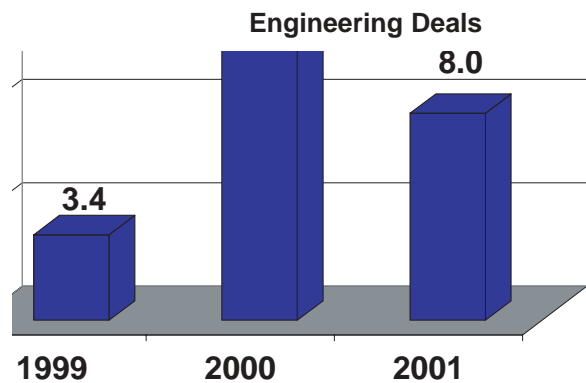
Many of the engineering technologies disclosed in recent years have been licensed to start-up companies. In FY 2001, seven of the eight license deals involving School of Engineering technologies were to UVA start-up companies. These start-ups are the results of efforts of faculty entrepreneurs who wish to pursue the commercialization of their own discoveries.

One such faculty entrepreneur is Doris Kuhlmann-Wilsdorf, who along with her business partner Richard Martin, formed the company HiPerCon, LLC. HiPerCon is developing commercial products based on Dr. Kuhlmann-Wilsdorf's fiber motor brush technology which has great potential for increasing the reliability of electronic motors, most notably those that propel Navy submarines. Dr. Kuhlmann-Wilsdorf's inventions earned her the 2001 Christopher J. Henderson Inventor of the Year Award (see story on page 15).

Another School of Engineering spin-off company is Directed Vapor Technologies, Inc. (DVTI). DVTI is developing new commercial processes for applying advanced coatings, such as thermal barrier coatings used on jet engine turbine blades.

Haydn Wadley and James Groves of the Intelligent Processing of Materials Laboratory have developed a novel vapor deposition system that is faster and more efficient than physical and chemical deposition systems currently used to apply such coatings. Their directed vapor deposition (DVD) machine, which uses an inert gas stream to focus the deposition material vapor (like a spray-paint gun), was patented by the Patent Foundation in 1996.

Inventors James Groves, Derek Hass and Doug Queheillalt joined respected businessman and former Patent Foundation president James Ross to create DVTI, a company focused on novel coatings using the DVD process and machine. Soon after formation, Dr. Wadley joined his colleagues to round out the DVTI management team. DVTI has licensed eight patents and patent applications from the Patent Foundation, and has begun commercial development with funding from the U.S. Government and from potential commercial customers.



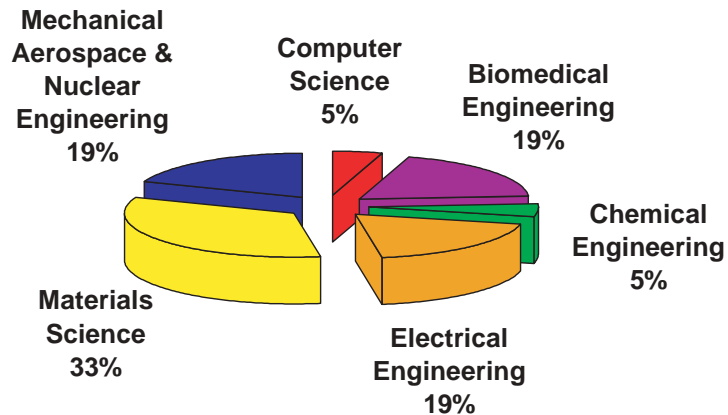
For the better part of the 1990's, Andrew Grimshaw and colleagues in the Computer Science Department carried out a middleware computing project known as Legion. The resulting Legion software provides a framework on which different computer systems running on different platforms can be integrated, providing for more efficient program operation and data transfer.

Recognizing the commercial potential of the Legion software, Dr. Grimshaw and his colleagues formed the new company Applied MetaComputing, LLC, to commercially develop and market the software. Applied MetaComputing obtained the rights to

the Legion software from the Patent Foundation, and shortly thereafter, obtained multi-million dollar funding from the venture capital community. The company, now known as Avaki, Inc., has now raised over \$16 million in financing, and has announced that three biotechnology companies will be the first customers for the company's grid technology products.

Other School of Engineering faculty inventor/entrepreneurs include Electrical Engineering Professor Thomas Crowe (Virginia Diodes, Inc.), Aerospace Engineering Professor Gabriel Laufer (Avir, LLC), and Systems Engineering Professor Thomas Hutchinson (ERICA, Inc.).

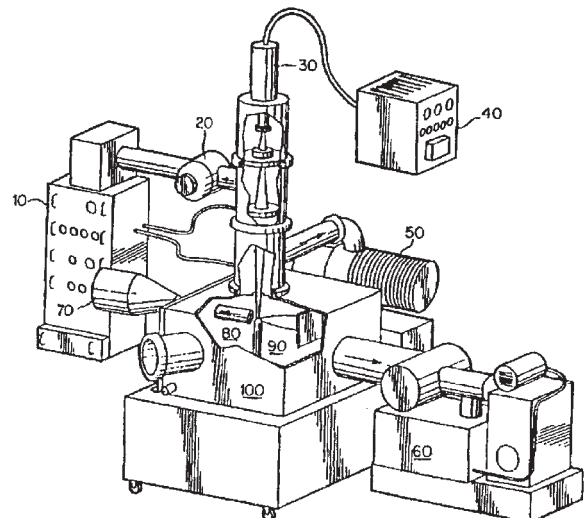
Engineering Disclosures by Department



Directed Vapor Deposition of Electron Beam Evaporant

Patent No. 5,534,314 (1996)
 Haydn Wadley and James Groves
 Licensed to DVTI

Like other vapor depositions used in industry, UVA's Directed Vapor Deposition (DVD) system uses a high energy electron beam to evaporate a metallic, ceramic, or similar coating material. But unlike other systems, the DVD system adds an inert gas stream to capture evaporated coating atoms and carry them to a pin-pointed location on the substrate. Similar to spray painting, but on an atomic level, the DVD system provides for a uniquely controllable deposition process capable of the highest known deposition rates. This figure is a schematic representation of the first generation DVD system developed at UVA's School of Engineering and Applied Science.



Doris Kuhlmann-Wilsdorf 2001 Inventor of the Year

Doris Kuhlmann-Wilsdorf, who has been teaching physics and materials science for more than 40 years, was the recipient of the 2001 Christopher J. Henderson Inventor of the Year Award for her inventions relating to wire electric motor brushes.

The Henderson Inventor of the Year award was given to Dr. Kuhlmann-Wilsdorf to recognize her research accomplishments and the great potential value of her six patented inventions relating to electrical brushes. The brushes in electric motors and generators establish the critical electrical connections between stationary and rotating parts. Similar brushes are used to connect moving electric trains with stationary overhead electrical cables.

Dr. Kuhlmann-Wilsdorf's inventions are designed to avoid wear problems associated with commonly-used carbon motor brushes. Dr. Kuhlmann-Wilsdorf's brushes are "multi-contact" brushes made of various metals and alloys that have been drawn into hair-fine fibers. Substitution of Dr. Kuhlmann-Wilsdorf's multi-contact wire brushes is already feasible in a variety of applications, and they have shown dramatically enhanced performance and longevity in long-term testing in marine propulsion motors.

The Patent Foundation is pursuing international patent protection for Dr. Kuhlmann-Wilsdorf's metal fiber brush inventions, and these patent rights have been licensed to Dr. Kuhlmann-Wilsdorf's start-up company, HiPerCon, LLC.

The Inventor of the Year award is the Patent Foundation's way of recognizing an invention of notable value to society. Criteria for selection include commercial success (actual or potential) and the invention's value in treating disease, protecting the environment, as a tool for research, in education and training, in the development of a field of science or technology, and/or in helping the disadvantaged, the disabled or the elderly.

The Patent Foundation named the Inventor of the Year Award after Christopher J. Henderson, President and Chief Financial Officer of Robbins & Henderson, a New York firm specializing in financial and related services for institutions, in recognition of Henderson's interest in technology transfer and commitment to the University. Established in 1992, the award program was conceived by Dr. Richard Edlich, Distinguished Professor of Plastic Surgery and Biomedical Engineering at UVA.

"I very much appreciate the Patent Foundation recognizing the value that the metal fiber brush technology may have for society. It would be a dream come true to see metal brushes widely used in electric motors across the country. I could not have gone this far without the support and contributions of my colleagues." Doris Kuhlmann-Wilsdorf, May 2, 2001



photo by Chris Harris

Dr. Doris Kuhlmann-Wilsdorf, 2001 Inventor of the Year.

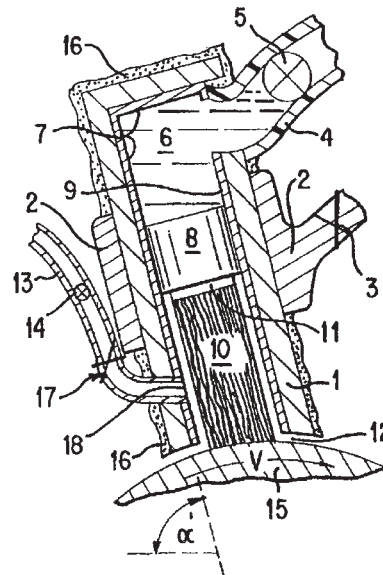
Continuous Metal Fiber Brushes

Patent No. 6,245,440 (2001)

Doris Kuhlmann-Wilsdorf, David Makel and George Gillies

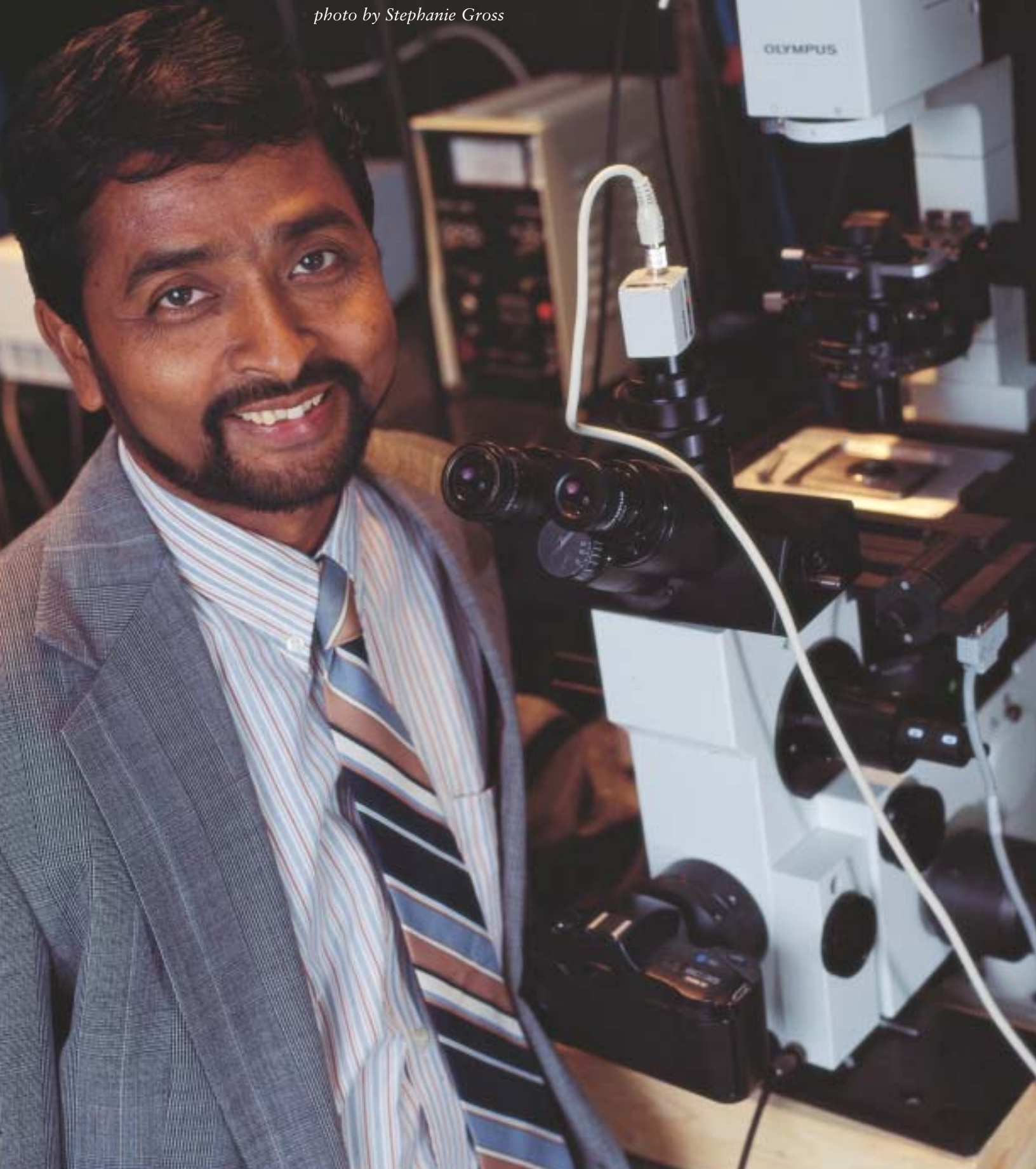
Licensed to HiPerCon, LLC

Large electric motors, like those that power naval ships or stationary pumps, consume hundreds of thousands of conductive carbon fiber brushes a year. Due to friction between carbon fiber brushes and the stator across which they sweep, carbon brushes wear down quickly (leading to costly brush replacement and motor down time) and leave substantial amounts of carbon dust in the motor, degrading the motor's performance. Metallic fiber brushes developed at UVA last up to five times longer than their carbon counterparts, increase motor efficiency by more than 30%, and leave behind almost no residue as they wear. This figure is a schematic cross-sectional view of a metallic fiber brush in action.



Dr. Ammasi Periasamy of the W.M. Keck Center for Cellular Imaging stands by an Olympus IX-70 Infinity microscope used for conventional epifluorescence microscopy.

photo by Stephanie Gross



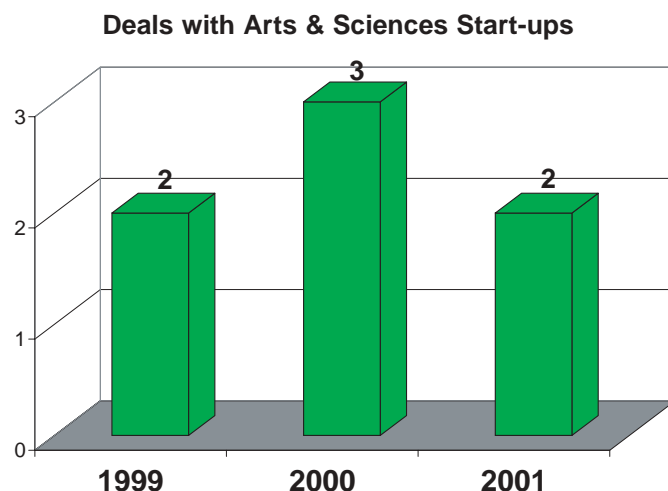
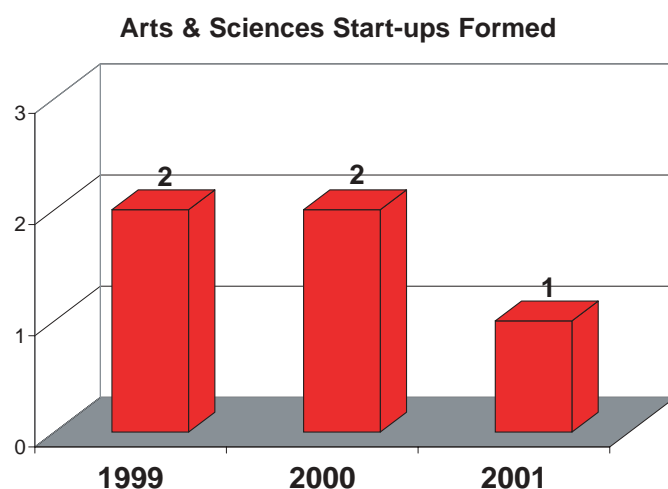
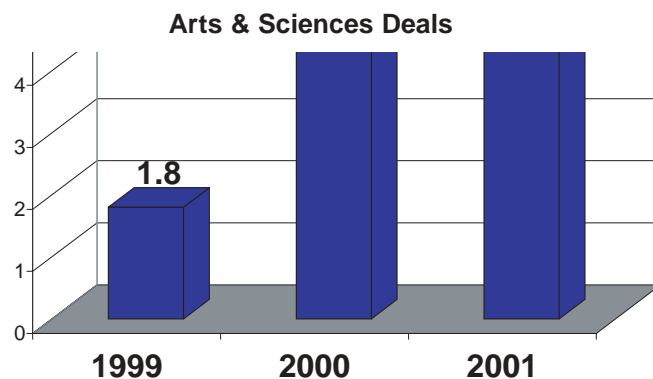
College of Arts & Sciences

In 2001, the spirit of discovery flourished in the College of Arts & Sciences, resulting in 36 new inventions - twice as many as the year before. This increase is most likely a combined result of increased research funding at the College and a rise in awareness of the Patent Foundation's role. Research funding at the College of Arts & Sciences topped the \$40 million mark this year.

The majority of inventions from the College came from the Chemistry department. However, there were also inventions from the departments of Biology, Physics, and Psychology. The Drama department also submitted an invention disclosure relating a novel panel saw for set construction.

Several inventions with considerable promise have come from the Chemistry Department laboratory of Milton Brown, Assistant Professor of Chemistry. Research in Dr. Brown's laboratory is targeted at the design, synthesis and biological evaluation of novel therapeutic agents. Projects presently underway in his laboratory encompass diverse areas of interest, including the development of new oral general anesthetics, synthesis of new neuronal voltage sensitive sodium channel blockers to combat prostate and small-cell lung cancer, and novel therapeutics for heart disease. The Patent Foundation has several pending patent applications on drug discovery inventions by Dr. Brown and his colleagues.

One of UVA's most prolific inventors is Tim Macdonald, Professor of Chemistry. His research on mechanisms of small molecule-protein interactions has enabled him to develop new drugs with fewer toxic side effects than similar drugs now on the market. For example, the drug Felbatol® was approved for use in treating epilepsy by the Food and Drug Administration in 1993, but this approval was subsequently amended to require warnings about rare but serious side effects. Because of these side effects, Felbatol® is now used only if other drugs prove to be ineffective and the physician determines that the risks of these side



effects is out-weighted by the benefits of its use. Dr. Macdonald and his colleagues have synthesized chemical derivatives that are metabolized differently by the body, in order to avoid a particular by-product that Dr. Macdonald has hypothesized to be the primary cause of Felbatol®'s side effects. These derivatives have been the subject of several patent applications. The Patent Foundation has entered into a licensing agreement with MedPointe Healthcare, Inc. (previously known as Carter-Wallace, Inc.), under which MedPointe plans to market Dr. Macdonald's Felbatol® derivative for treatment of nervous system disorders. MedPointe has worldwide rights for the development and commercialization of the new drug.

Another promising College of Arts & Sciences invention was disclosed to the Patent Foundation by an undergraduate student. During her fourth year as a student in the distinguished majors program in Psychology, Nikki Kissane developed a simplified sign language system to facilitate communication with stroke victims, children with autism or mental retardation, and individuals with cerebral palsy. Ms. Kissane's invention arose from her work in Psychology Professor John Bonvillian's research program relating to sign-language communication for non-speaking, hearing individuals. The Patent Foundation filed for copyright registration on the new sign language system, and the system has been placed online at www.simplifiedsigns.org, in order to generate feedback from parents and educators. Ms. Kissane is now pursuing her M.D. degree at the Medical College of Virginia.



photo by Erin Garvey

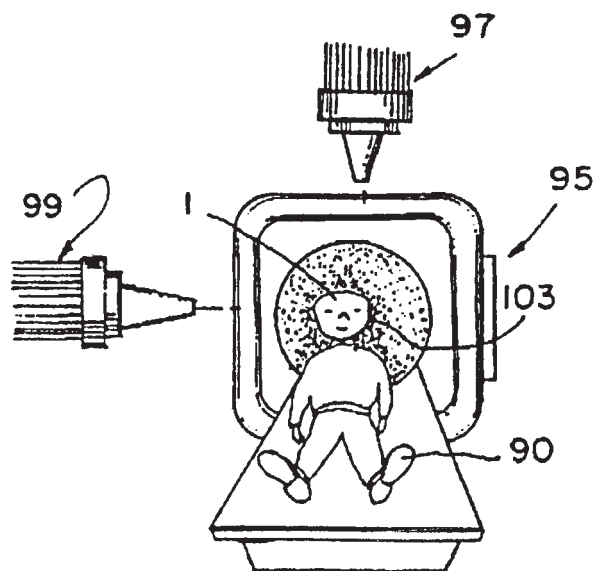
Dr. Milton Brown of the Chemistry Department.

Magnetic Stereotactic System for Treatment Delivery

Patent No. 5,779,694 (1998)

Matthew Howard, Marc Mayberg, M. Sean Grady, Rogers Ritter and George Gillies
Licensed to Stereotaxis, Inc.

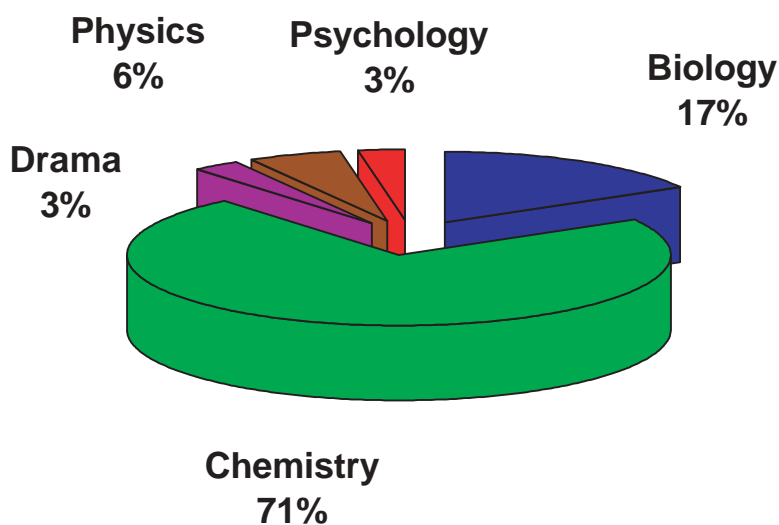
One of the most important inventions resulting from UVA research is an apparatus for delivery of therapeutic agents to hard-to-reach portions of the body. UVA researchers have developed a system whereby a small magnetic object dragging an encapsulated therapeutic agent is moved through the body by an intricate array of external magnets. This system is ideal for the delivery of drugs to specific regions of the brain. This stereotactic system resembles a basic MRI machine. This figure illustrates a magnetic drive system using superconductive drive magnets.



Fluorescence resonance energy transfer (FRET) microscopy is a technique used to visualize the protein interactions in living cells. Ammasi Periasamy, Director of the W.M. Keck Center for Cellular Imaging and a well-known leader in the field of microscopy, has developed a software program for quantitative analysis of FRET signals. The new software removes contaminating background noise, is user-friendly, and imports easily to any computer platform. Dr. Periasamy and the Keck Center are organizing workshops for FRET researchers around the world, to instruct these researchers on methods for performing FRET analysis and the use of Dr. Periasamy's software.

Louis Bloomfield, Professor of Physics, has invented a windchill sensor that measures windchill accurately, quickly, and reliably using an inexpensive sensor with no moving parts. The device works by sensing heat loss, which occurs as a function of wind, humidity and air density. Windchill meters based on this technique could be as portable, easy to use, fast, and as practical as ordinary digital thermometers are today. Such portable devices could become common accessories for skiers, mountain climbers, and hikers. This invention could also be used to create an array of sensors for accurately determining wind speed and direction.

A&S Disclosures by Department





Providing Tailored Business Services to the Faculty Entrepreneur

www.spinnertech.com

Spinner Technologies, Inc., was founded in 2000 by the Patent Foundation in response to increasing faculty interest in forming start-up companies based upon UVA inventions. Since 1997, the number of inventions disclosed to the Patent Foundation has increased by over 80%. Many of these inventions are too early-stage to attract licensing interest from large, established companies. By encouraging and supporting UVA faculty who wish to form new companies to commercialize their inventions, Spinner helps bring to market UVA technologies that might otherwise never be developed. In the process, Spinner also is helping to foster a local technology-based business sector, which in the long run will enrich the UVA research community.

Spinner Technologies helps faculty form these companies by providing innovative business advice tailored to the needs of each developing start-up company, drawing upon the Patent Foundation's substantial licensing, management, and financing expertise. Some of the services Spinner Technologies provides include: assisting in formulation of the core business concept, forming the new company, aiding in the development of the business plan, assisting with SBIR and STTR applications, and providing low-cost, flexible-term laboratory and office space. In addition, Spinner Technologies assists member companies with corporate administration, such as setting up bookkeeping and personnel policies. Spinner Technologies also provides a referral service for FDA advisors, insurance providers, corporate financing entities, and interim management teams. Spinner Technologies plans to continue to expand the nature and extent of its services as members' needs grow and as more resources are secured.

Spinner Technologies has recently financed the construction of two 1,000 square foot laboratories in the new Emerging Technology Center at the University of Virginia Research Park at North Fork. These laboratories will be occupied by two UVA faculty start-ups. One laboratory will be occupied by Professor Joel Linden's company, Adenosine Therapeutics, Inc., and the other will be occupied by Professor Sid Hecht's company, Pinnacle Pharmaceuticals, Inc. Spinner hopes to construct additional laboratories at North Fork, as funding for such projects becomes available.



The Emerging Technology Center, located in the University of Virginia Research Park at North Fork. Spinner Technologies is developing two 1,000 square-foot laboratory spaces in the \$4.4 million, 40,000 square-foot building.

The goal of Spinner Technologies is to form 30 to 40 start-up companies over the next five years. In exchange for the assistance and resources provided to these start-ups, Spinner Technologies retains a small percentage of equity which in the long run will hopefully provide a return on investment that can fund additional services. In the process, Spinner hopes to return considerable value to UVA. Start-ups supported by Spinner Technologies are expected to sponsor research at UVA, grow into Spinner's wet labs in the Corner Building and in the Emerging Technology Center at North Fork, and otherwise develop intimate relationships with UVA. This will lead to increased job opportunities for UVA graduates and spouses, and hopefully contribute to faculty retention and recruiting. Eventually, Spinner Technologies may sell some of its retained stock in successful start-ups to provide funds for expanded services, and to provide dividends to the Patent Foundation and to UVA. Spinner-supported start-ups are also hoped to provide strong patent royalty returns to the Patent Foundation.

Start-Up Companies Which Have Licensed Technology from the Patent Foundation

Company Name	Faculty Involved	Product
Adenosine Therapeutics, LLC	Joel Linden, et al.	Pharmaceuticals
Alglutamine, LLC	Richard Guerrant	Food Supplement
Avaki Corporation	Andrew Grimshaw, et al.	Parallel Processing Software
Argonex, Inc.	Vic Englehard, Don Hunt, Craig Slingsluff	Vaccine
Avir, LLC	Gabriel Laufer	Chemical Detectors
CardioConcepts, Inc.	Lawrence W Gimple	Medical Software
Casenex, LLC	Robert McNergney, Joanne Hobert	Educational Software
Cold Cure, Inc.	Jack Gwaltney	Pharmaceuticals
ContraVac, Inc.	John Herr	Medical Diagnostic
Cottler Technologies, LLC	Patrick Cottler	Medical Devices
DirectGene, Inc.	Leland Chung	Gene Therapy
DVTI	Haydn Wadley, Derek Hass, Doug Queheillalt	Engineering Device
Elusys Therapeutics, Inc.	William Sutherland, Ronald Taylor	Pharmaceuticals
ERICA, Inc.	Tom Hutchinson	Engineering Device
GeNeuron Therapeutics, Inc.	Greg Helm, David Kallmes	Pharmaceuticals
GI Stimulation, Inc.	Robert Ross	Electronic Devices
HiPerCon, LLC	Doris Kuhlman-Wilsdorf	Electric Brushes
HKL Research, Inc.	Wladek Minor	Imaging Software
Humagen Fertility Diagnostics, Inc.	John Herr	Diagnostic Kit
Indoor Biotechnologies Limited	Martin Chapman	Diagnostic Kit
Insmed Pharmaceuticals, Inc.	Joseph Lerner	Pharmaceuticals
Medical Automation Systems, Inc.	James Boyd, John Savory, Randall Moorman, Pamela Griffin	Medical Software
Pinnacle Pharmaceuticals, Inc.	Sidney Hecht	Pharmaceuticals
Respiratory Research, Inc.	John Hunt	Medical Devices
RhinoTech International, LLC	Jack Gwaltney, Owen Hendley, Birgit Winther	Cosmeceuticals
Stereotaxis, Inc.	George Gillies, Rogers Ritter	Medical Devices
Virginia Diodes, Inc.	Tom Crowe, William Bishop	Electronic Devices
Willis Optics, LLC	Jim Beach	Optical Devices
Yabko, LLC	Jiri Sklenar	Medical Software

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Jeffrey Wilk and Lynn Pillow

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Purpose of FAC

The Faculty Advisory Committee (FAC) provides one-on-one advice and counseling to UVA faculty members on the patenting process, including identifying inventions, evaluating prior art and publications, managing strategic alliances with industry, negotiations, licensing, and forming start-up companies. Emphasis is placed on how to disclose inventions, how to manage interactions with patent attorneys, the structuring of broad and relevant patent claims, and most importantly, the types of data required to successfully obtain key patent claims. The FAC may also be approached for suggestions on research strategies to enhance the patentability of basic discoveries by focusing on proof of principle experiments. The FAC serves as a sounding board for UVA faculty seeking to understand and critique the process and the pitfalls of intellectual property management, patenting, and technology transfer. The FAC also provides advice to the Patent Foundation on matters of policy affecting UVA faculty.

University of Virginia Patent Foundation

CONSOLIDATED STATEMENT OF ACTIVITY

For the Fiscal Year Ended June 30, 2001

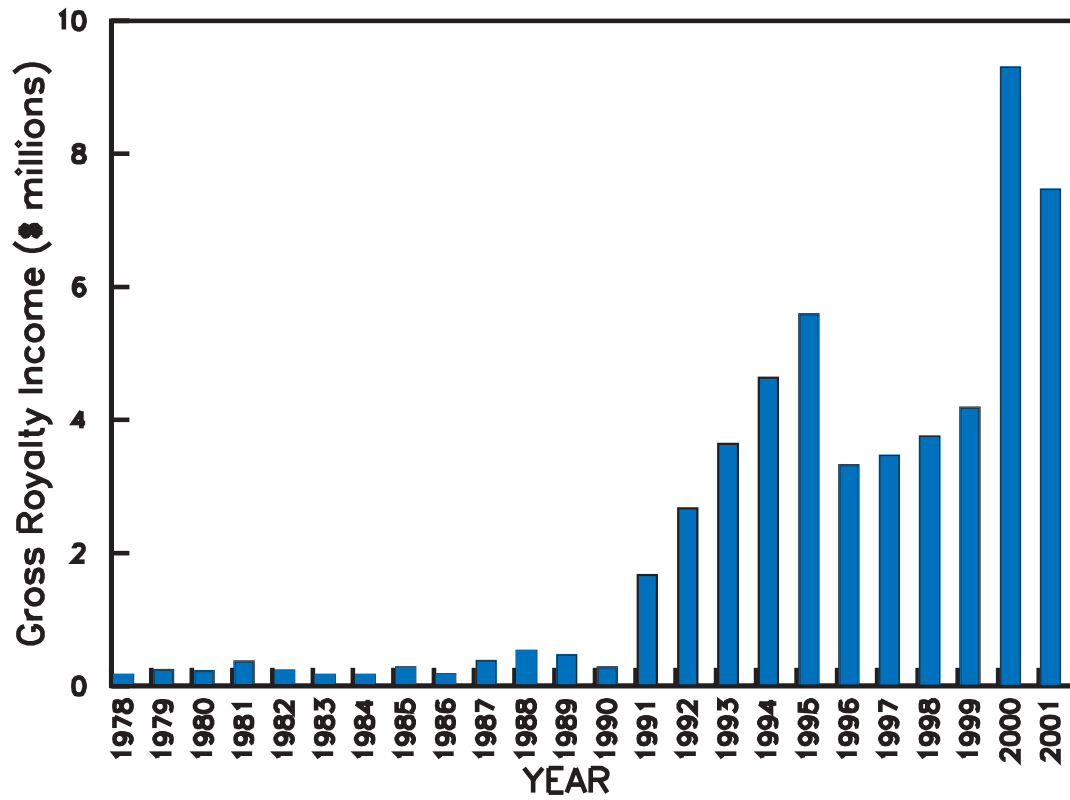
<u>REVENUES</u>	
License fees and royalties	7,467,663
Research Grants	58,000
Patent costs reimbursed	449,067
Interest income	<u>125,582</u>
Total revenue	8,100,312
<u>DISTRIBUTIONS</u>	
Distributions to University of Virginia	2,727,264
Distributions to inventors	1,977,524
Other distributions (CIT, CME, ATI, etc.)	<u>36,023</u>
Total distributions	4,740,811
Net revenues	3,359,501
<u>OPERATING EXPENSES</u>	
Salaries, benefits, and taxes	1,335,695
Conventions, training, and travel	40,000
Outside Patent costs *	453,103
General legal and professional fees	69,588
Rent and depreciation	166,643
Office expenses	120,411
Marketing and public relations	33,133
Board of Directors' expense	6,586
Reserve for uncollectible royalty and patent costs	79,904
Other	<u>30,352</u>
Total expenses	2,335,415
<u>INCOME FROM OPERATIONS</u>	1,024,086
<u>OTHER INCOME (EXPENSE)</u>	
Unrealized loss on marketable equity securities ^	(831,098)
Loss on sale of securities	(50,268)
Administrative support reimbursed from Spinner, Inc.	20,250
<u>NET INCOME</u>	
Total net income	162,970

The Patent Foundation's financial statements for the year ended June 30, 2001 were audited by Hantzmon, Weibel & Company, a certified public accounting firm. This condensed financial information is derived from those financial statements.

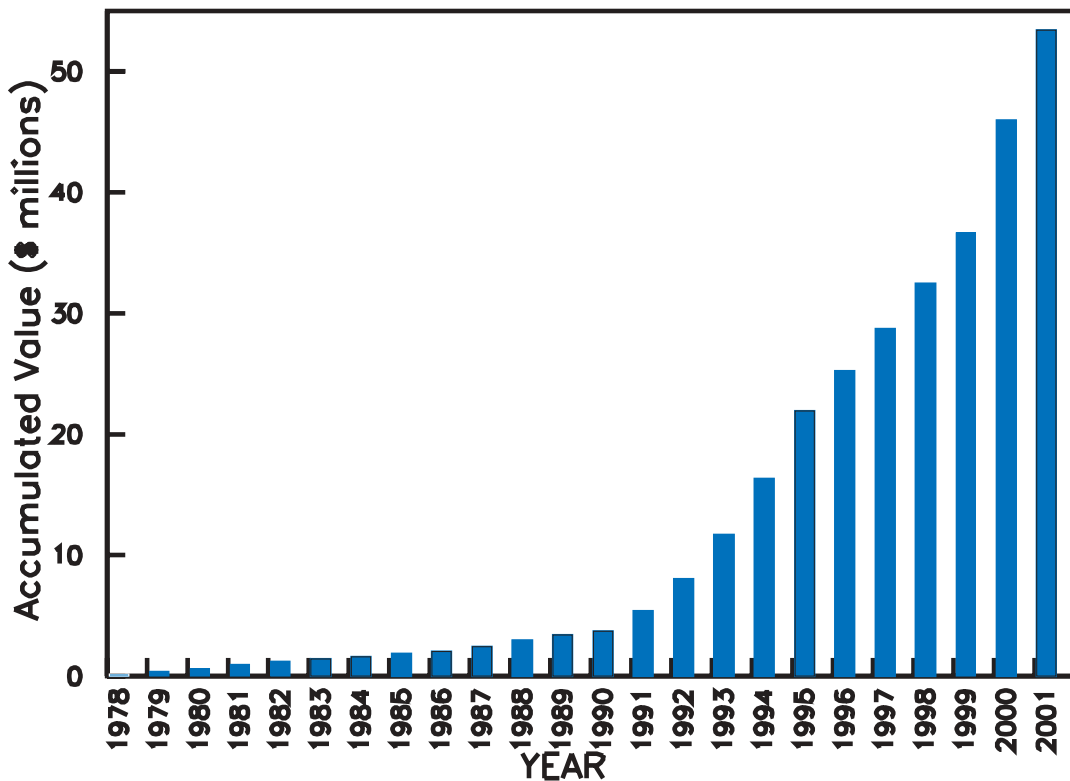
* does not include over \$1 million in patent costs paid by licensees directly to outside counsel on the Patent Foundation's behalf.

^ note that this is calculated - but - unrealized income (loss) in the form of unsold Insmed stock, which is subject to substantial market price fluctuations until sold.

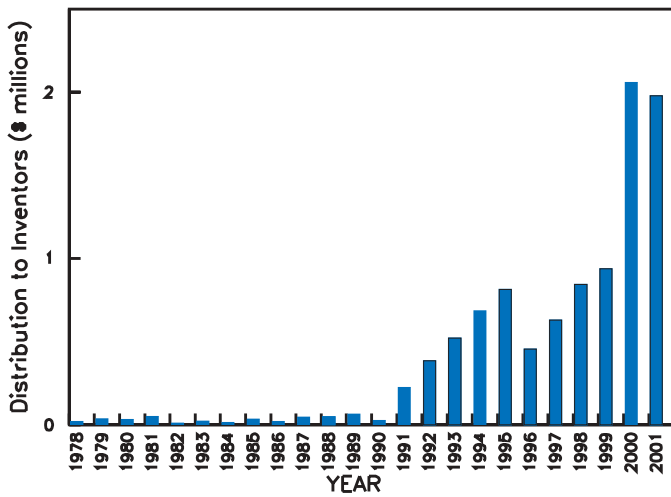
Gross Royalty Income



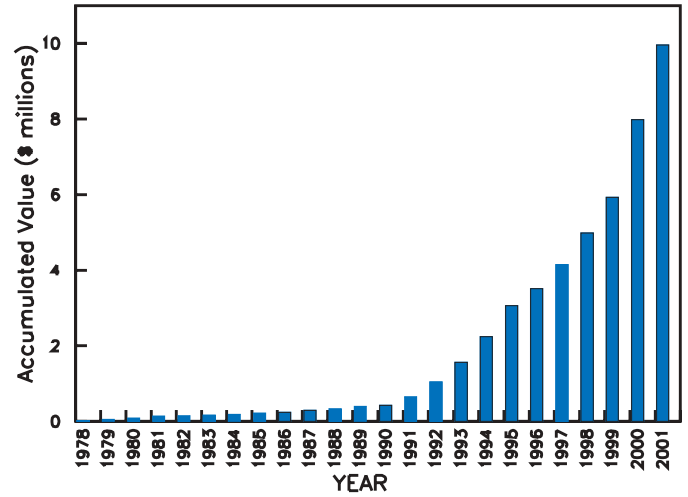
Accumulated Gross Royalty Income



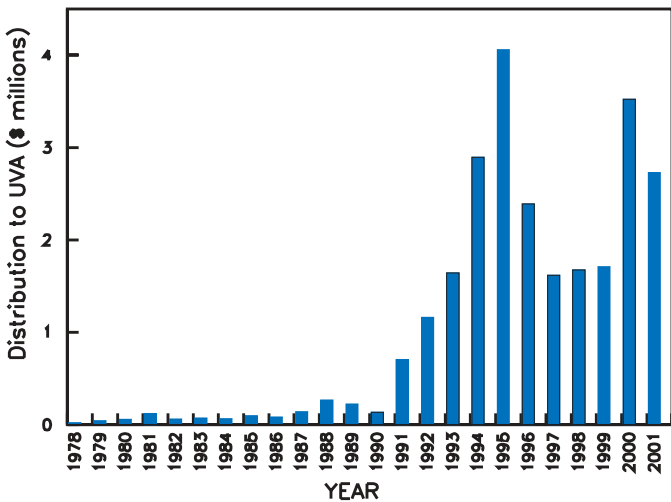
Distribution to Inventors



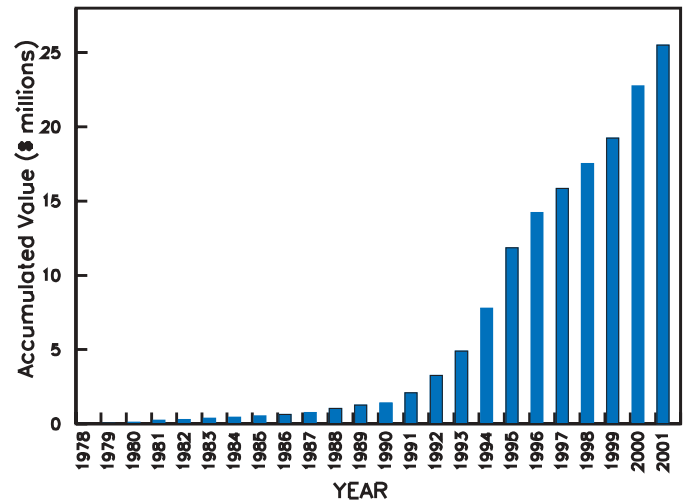
Accumulated Distribution to Inventors



Distribution to UVA



Accumulated Distribution to UVA



Patent Royalty Distribution Schedule

Total Royalty Income (\$)	Inventor's Income %	Inventor's Research %	Patent Foundation %	Inventor's School %	Scholarly Activities Fund %
<100,000	50	7.5	42.5		
100,000-299,999	30	20	42.5	7.5	
300,000 - 999,999	25	15	40	10	10
>1,000,000	15	15	40	20	10

Software Royalty Distribution Schedule

Total Royalty Income (\$)	Inventor's Income %	Inventor's Research %	Patent Foundation %	Inventor's School %	Scholarly Activities Fund %
<100,000	50	25	25		
100,000-299,999	30	30	25	10	5
>300,000 -	25	25	25	15	10