

UNIVERSITY OF IOWA
Action on the Strategic Plan for
Technology Transfer and Economic Development
October 2000

Executive Summary

The UI experienced a successful year in FY 2000, extending or maintaining its various technology transfer activities. Corporate sponsored research at The University of Iowa in FY 2000 was \$33.1 million, bringing the five-year total industrial research support to \$154.3 million. It represented 13.1 percent of the \$252.6 million in external support reported by the University during the year. The University Division of Sponsored Programs (DSP) and the Clinical Trials Office successfully negotiated 365 corporate research agreements in FY 2000, bringing the five-year total of corporate research agreements to 1,781.

The University of Iowa Research Foundation (UIRF) maintained a high level of activity during FY 2000. The UIRF received 84 invention disclosures, filed 83 U.S. patent applications, reported a record high 37 issued patents, executed a record high 27 license and option agreements, and earned a record high \$5,067,469 in royalty/license fee income (see Appendix for details and trends). Importantly, the UIRF hired a new technology licensing associate and began a search for a second licensing associate to fill a new position created in FY 2000 due to the growing UIRF technology portfolio.

A new director for the Office of Research Marketing and Corporate Relations was hired in September 1999 and a new assistant director was appointed in February 2000. The new title reflects an emphasis on general research-related corporate relations in addition to previous activities. In FY 2000, RMCR: (i) organized numerous campus visits by corporations and facilitated faculty/staff meetings with potential corporate partners; (ii) developed and began to implement a plan for outreach and site visits to Iowa corporations to proactively explore opportunities for UI partnerships; and (iii) represented UI at conferences, including the annual BIO meeting.

The Technology Innovation Center (TIC) accepted five new tenant firms in FY 2000. It also successfully graduated three companies and reported 17 tenants occupying 100 percent of available laboratory space and approximately 75 percent of available office space. As part of a plan to address a shortage of flexible wet lab space for start-up biotech companies, the UI committed institutional funds to construct a building shell and the Iowa Department of Economic Development accepted the Oakdale Research Park as recipient of a \$500,000 Advanced Research Commercialization (ARC) award that will be used to build out laboratory space for the TIC incubator. The College of Medicine and the Center for Biocatalysis and Bioprocessing continued to provide short-term assignment of lab space for three biotech start-ups.

The Oakdale Research Park (ORP) experienced continued growth in FY 2000. A major new addition to the UI Multi-Tenant Facility will provide corporate-funded research space for a portion of the UI ophthalmology research program as well as flexible wet laboratory research space for start-up companies in the TIC business incubator. In the privately-owned Myriad Technology Plaza complex, Albany Molecular Research, Inc. committed more than \$3 million to convert an office building to a wet laboratory facility and thus enable a significant expansion of TIC tenant EnzyMed Division/AMRI. Research staff of the National Advanced Driving Simulator (NADS) began working through a detailed checklist of systems and equipment prior to placing the NADS in operation. Seven R & D companies had a presence on the ORP. NADS is the fourth of four UI "anchor labs" to be strategically established at Oakdale.

UNIVERSITY OF IOWA
Technology Transfer Highlights
July 1999 – June 2000

This report presents some highlights of University of Iowa technology transfer activities in FY 2000. These and other activities are also included in a formal action report on The University of Iowa Strategic Plan for Technology Transfer and Economic Development.

These highlights reflect technology transfer activities that are consistent with the vision and goals of *Iowa 2010* to encourage “new economy” growth in the high technology areas of Information Solutions, Advanced Manufacturing and Life Sciences.

Corporate Research Funding and University Inventions

Important Corporate Funding – University of Iowa faculty attracted \$33.1 million in corporate sponsored research funding in FY 2000, the second-largest total in UI history. Industrial research funding represented 13.1 percent of \$252.6 million in external support that the University attracted from all sources in FY 2000. Over the past five years, UI researchers won \$154.3 million in corporate research grants and contracts.

Corporate Research Agreements – In addition, the University’s Division of Sponsored Programs and the Clinical Trials Office successfully negotiated 365 corporate research agreements in FY 2000. Over the past five years, the UI has successfully negotiated 1,781 corporate research agreements.

Patents, Earnings Set Records – FY 2000 was another productive year for intellectual property management at the University. The University of Iowa Research Foundation received 84 invention disclosures from faculty and staff, filed 83 U.S. patent applications, reported 37 issued patents, executed 27 technology licensing / option agreements, and earned \$5,067,469 in royalty/license fee income (details and trends are reported in the Appendix of the Strategic Plan for Technology Transfer and Economic Development). The number of issued patents, executed licenses / options and the earnings in FY 2000 were annual record high totals.

DuPont Update – In FY 2000, the Center for Biocatalysis and Bioprocessing (CBB) continued technology development for industrial licensing and use on a series of patents donated to The University of Iowa Research Foundation (UIRF) by DuPont in FY 1999. The intellectual property involves a recombinant yeast that produces an enzyme commonly found in spinach. This spinach enzyme, Glycolate Oxidase (GO), converts α -hydroxy acids, like lactic acid, to α -keto acids. This conversion is important in the production of specialty chemicals, pharmaceutical intermediates and food ingredients. Based on direction from a faculty advisory committee and with funding support from the UIRF, the CBB successfully expressed the recombinant enzyme in high titers, and established parameters for efficiently converting lactic acid to pyruvic acid. The CBB continues to work with DuPont scientists in establishing the lactic acid to pyruvic acid reaction at pilot scale using the CBB fermentation laboratory.

Corporate Collaboration – One of the UI research agreements is with the EnzyMed Division/AMRI, a five-year collaboration that matches University research efforts with complementary pharmaceutical technology at EnzyMed/AMRI. Under this agreement, UI researchers working on new compounds or on biological targets for drugs may collaborate with EnzyMed/AMRI. The company’s proprietary BIOACTIV™ technology enables the company to generate large libraries of chemically related

compounds. If a target identified at the UI leads to identification of a marketable new drug, the UI and EnzyMed/AMRI will share in the benefits of commercialization. A \$460,000 Advanced Research and Commercialization (ARC) award from the Iowa Department of Economic Development to EnzyMed/AMRI is currently funding several EnzyMed/AMRI research collaborations with the UI and ISU.

CMV Promoter – Among the fascinating technology transfer successes at The University of Iowa is the CMV Promoter for Increased Protein Expression. These patented inventions resulted from a discovery in the laboratory of Mark F. Stinski, professor of microbiology, during Professor Stinski's study of gene regulation mechanisms in the CMV virus. Over a period of 15 years, this discovery has become a very widely used research tool in the biotechnology industry. The "CMV Promoter" has gained importance in the commercial setting to manufacture bioengineered drugs. Some of these new drugs have been granted FDA approval and are currently being used as therapies to treat patients with cancer and other diseases. The UIRF has thus far negotiated licensing agreements, on a non-exclusive basis, by fields of use, to more than 45 industrial partners including several new licensees in FY 2000.

Spin-Off News – The University of Iowa Research Foundation participates in creating "spin-off" companies by licensing inventions resulting from research in UI laboratories back to the new start-up firms, which then seek to develop and commercialize the technology. FY 2000 highlights involving several UI spin-off companies and other affiliates of the Technology Innovation Center business incubator and UI Oakdale Research Park are noted in the following section.

Business Incubator and Oakdale Research Park

The "Biofilms" Company – Quorum Sciences, Inc., an FY 1999 spin-off from UI biomedical research, made important progress in FY 2000, winning \$1 million in research support from the Cystic Fibrosis Foundation. The award will fund the development of a new antibacterial treatment for the leading cause of chronic lung infections in patients with cystic fibrosis, which afflicts more than 30,000 children and young adults in the U.S. The company was established by long-time biotechnology entrepreneur S.C. Turner and E. Peter Greenberg, UI professor of microbiology. Quorum Sciences is a biomedical research company dedicated to developing technology in the area of chemical signaling in bacteria. The company is involved in discovery of novel therapeutics to treat bacterial infections. Prof. Greenberg's work was nationally profiled in the August 14, 2000 U.S. News & World Report and the Sept. 13, 1999 Business Week. Quorum Sciences' goal is to design compounds that will disrupt bacterial defense systems and make them more sensitive to the host's immune system and traditional antibiotics. Other industrial applications could prevent biofilms from fouling contact lenses and medical devices such as catheters, unblock water pipes and protect ship hulls [Note: Aurora Biosciences Corporation of San Diego, Calif. announced on Oct. 20, 2000 that it will acquire Quorum Sciences, Inc. The acquisition will enable Quorum to further expand its business and research prospects while remaining in Iowa. This development will be more fully discussed in the FY 2001 report.].

Bioscience Spin-Off Expands – Integrated DNA Technologies, Inc. is a University of Iowa spin-off founded by former UI Biochemistry Professor Joseph Walder and is one of the early graduates of the Technology Innovation Center business incubator. The UI Oakdale Research Park had not yet been established in FY 1989 when Integrated DNA needed to leave the incubator and expand, so the growing company built a 20,000 square foot laboratory building in north Coralville near Oakdale. Integrated DNA remains based in Coralville today and has emerged as a leading manufacturer of nucleic acid products used in genetic and biological research. The UI spin-off continued to grow in FY 2000. It now

has more than 160 employees and is fast approaching \$15 million in annual sales. Under Dr. Walder's leadership as company president, IDT has expanded into the corporate research market and has begun providing ever more sophisticated products and services, such as gene synthesis, genetic sequencing, and most recently, DNA-arrays. IDT is committed to novel in-house research and development and appears positioned to be a leader in the biotechnology revolution and a prominent Iowa high-tech employer in FY 2001 and beyond.

Leader for Young Readers – Breakthrough to Literacy, Inc. graduated from the UI business incubator in FY 2000 and expanded its company in Iowa on the UI Oakdale Research Park. Breakthrough is a University spin-off founded in 1987 by Dr. Carolyn Brown and her husband, Dr. Jerry Zimmermann. Breakthrough initially focused on developing assistive technology for persons with disabilities, but eventually concentrated on helping young children learn to read. During its incubation at the TIC, Breakthrough emerged as a national leader in developing an effective interactive process that helps children become readers. Breakthrough's proprietary multi-media programs are part of the early learning environments in 39 states, 296 school districts, 1,063 schools and 4,167 classrooms serving 89,340 children. The company has a staff of 46 employees at its Oakdale headquarters and a network of 70 regional consultants around the nation. The Wright Group of Bothell, Washington, a leading educational publisher and a subsidiary of the Tribune Company of Chicago acquired Breakthrough in late FY 1997. McGraw-Hill, Inc., one of the world's largest publishers, acquired Breakthrough in September, 2000. Breakthrough is yet one more example of a successful UI-bred technology company choosing to remain in Iowa because of the talented workforce, quality of life, cost of doing business and opportunity to sustain its important relationships with the UI.

Biotech Spin-Off Expands – EnzyMed Division/AMRI experienced a landmark year in FY 2000 that will lead to important growth in FY 2001 and beyond. In October 1999, Albany Molecular Research, Inc. (AMRI) completed acquisition of EnzyMed, Inc. for \$20.6 million. A UI spin-off and UI incubator tenant since it was founded in 1994, EnzyMed/AMRI's proprietary technology, termed BIOACTIV™, enables it to rapidly and efficiently identify, screen, and make improved variations of candidate drugs and agrochemicals. EnzyMed/AMRI's proximity to the state-funded Center for Biocatalysis and Bioprocessing at Oakdale is a major factor in the firm's growth to this point. Because of its relationships with the UI, AMRI will complete a \$3.5 million laboratory expansion for the EnzyMed Division on the Oakdale Research Park in FY 2001. Importantly, EnzyMed/AMRI has long-term research collaborations with both Iowa State University and The University of Iowa that are funded by an Advanced Research Commercialization award from the Iowa Department of Economic Development.

Cooperative Project – Myriad Developers, a business unit formed by Central Iowa Power Cooperatives and Linn County Rural Electric Cooperative, welcomed its newest tenant, TIC incubator graduate Breakthrough to Literacy, Inc., to the Myriad Technology Plaza complex on the Oakdale Research Park in FY 2000. Upon completion of a 10,000 square foot laboratory in FY 2001, TIC tenant EnzyMed Division of AMRI will proceed to double its Iowa workforce to 50 employees over the next several years. The four-building project will then be home to five R & D companies including the Stanley Group, Ascend Technologies Inc. and Police Law Institute, along with Breakthrough and EnzyMed/AMRI.

Driving Simulation – Detailed reports on the Oakdale-sited anchor laboratories are included in the appendix to the formal annual report on technology transfer. The newest Oakdale anchor laboratory is the National Advanced Driving Simulator (NADS). The NADS instrument was delivered by the contractor and installed by late FY 2000. The complex process of going step-by-step through a lengthy checklist to make the system operational will continue into mid-FY 2001.

Anchor Laboratory Expansion Plans – In FY 2000, the University finished planning a 30,000 square-foot expansion of the Multi-Tenant Facility, the 48,000 square-foot laboratory building on the Oakdale Research Park. The Multi-Tenant Facility already houses two Oakdale anchor laboratories: Oakdale Medical Research of the UI College of Medicine and the Center for Biocatalysis and Bioprocessing, the state-funded industrial bioprocessing laboratory. Two corporate tenants of the Technology Innovation Center business incubator, EnzyMed Division/AMRI and Quorum Sciences, Inc., lease laboratory and office space in the building. When completed in FY 2001, the addition will provide needed space for the University's ophthalmology research program, which currently has laboratories in the multi-tenant facility. This laboratory phase of the project will be supported by funds from two corporate research agreements totaling \$6 million.

New Incubator Labs – The UI committed \$1 million in institutional funds to construct the second phase of the Multi-Tenant Facility addition as shell space that will be finished out as flexible laboratory space as funding is identified. In FY 2000, the Iowa Department of Economic Development agreed to accept the Oakdale Research Park as recipient of a \$500,000 Advanced Research Commercialization (ARC) award. The ARC funds will enable the UI to begin the laboratory build-out to provide much-needed flexible wet lab space to biotechnology companies in the UI Technology Innovation Center business incubator.

Ajile Systems, Inc. – Semiconductor design company Ajile Systems, Inc. graduated from the UI business incubator in FY 2000 and located its R & D activities in an expanded facility in Cedar Rapids. Ajile was founded in July 1999 by a group of Rockwell Collins engineers and a former UI engineering professor. They entered an exclusive licensing agreement with Rockwell to further the development of Rockwell's JEM Java™ microprocessor technologies. The objective is to develop and market custom integrated circuits that enable Java™ for use in low power embedded computer systems such as those found in hand-held devices. Ajile Systems expects to expand to 16 employees before production begins in December 2000.

Digital Artefacts, L.L.C. – One of five new incubator affiliates in FY 2000, Digital Artefacts, L.L.C. is an information visualization company established in FY 2000 to provide computer real-time graphics and simulation solutions to emerging non-traditional markets. The company was founded by a UI undergraduate, a graduate student and a faculty member in the UI computer science department. Digital Artefacts is focusing on developing visual databases and accompanying PC-based visual simulation software for use in exhibits, education, training, planning and marketing. The company will also develop tools and software for acquisition, organization and access to georeferenced visual data. Applications for this software include building geospecific databases and visualizing existing interior and exterior environments. The principals, working with the History Center of Cedar Rapids, helped devise "This Old Digital City," an interactive simulation that enables users to "explore" downtown Cedar Rapids as it looked in 1900. Digital Artefacts was featured as part of The University of Iowa exhibit at the Iowa State Fair in August 2000.

October 2000

UNIVERSITY OF IOWA
Action on the Strategic Plan for
Technology Transfer and Economic Development
October, 2000

Introduction: The University of Iowa submits the following report on activities related to technology transfer and economic development. The report is based on an earlier-prepared strategic plan for technology transfer drafted by the relevant units reporting to the UI Vice President for Research. These units include the Division of Sponsored Programs, the Oakdale Research Park, the Office of Research Marketing and Corporate Relations, the Technology Innovation Center, and the UI Research Foundation.

The Office of Research Marketing and Corporate Relations (RMCR) strives to advance UI research, teaching and service missions by pursuing the following general objectives in a balanced manner as part of its "Strategic Business Development" function :

- (a) To facilitate and foster cutting-edge, research-intensive alliances with corporations and leverage various sources of funding for selected research programs.
- (b) To undertake outreach to Iowa corporations to explore opportunities for partnerships.
- (c) To represent and showcase UI programs, capabilities and expertise to external constituencies and bring visibility to the UI through participation at national and international conferences.

The Oakdale Research Park strives to increase the academic vitality of the UI by fostering private sector relations with the University by attracting businesses with potential links to the University to the Park. Corporate locations on the Park increase the economic vitality of the region and State. The Park emphasizes such fields as pharmaceuticals, industrial biotechnology, health and medical sciences, and computer simulation of complex systems.

The Technology Innovation Center (TIC) is a business incubator which provides space and a range of services to new commercial enterprises.

The University of Iowa Research Foundation (UIRF) is the organization responsible for managing intellectual property created at the University. It is a freestanding foundation tied to the academic mission of the institution.

Without exception the plan for technology transfer follows from two goals articulated in the comprehensive strategic plan for the UI "Achieving Distinction: 2000": Goal 4 "(Conduct) the best possible research and scholarship" and Goal 6 "(Develop) strong ties between the University and external constituencies." Because the activity of technology transfer seeks to link the research and scholarly activities of the institution with external constituencies, this activity is a synthesis of these two institutional goals.

The format of this report follows that of the original strategic statement for technology transfer. Actions taken as a result of the plan-the core of this report-are shown in boldface type.

Goal I. Provide leadership in developing and disseminating intellectual property policies that maximize opportunities for technology transfer in a manner consistent with the academic missions of the University.

Objective A: Assure adherence to the intellectual property management practices of the (national) Committee on Governmental Relations (COGR).

Action: The UI is in compliance with COGR guidelines.

Objective B: Refine existing UI intellectual property policies.

Action: A draft revision of UI policies is under legal review. New policies on the treatment of "tangible research properties" such as chemical and biological materials and software were drafted and are under committee review.

Objective C: Make UI researchers more aware of opportunities and obligations associated with intellectual property.

Action: Units of the UI VP Research presented a series of educational seminars to the Department of Internal Medicine. Presentations have been prepared for the following areas:

- **Electronic resources for attracting nonfederal funding (i.e. private foundations, industry)**
- **Opportunities and policies associated with patents and licenses**
- **Fostering industry/UI relationships**
- **Conflicts of interest and commitment**

UIRF staff participated in two faculty-sponsored seminars and panel discussions on intellectual property: presentations to electrical engineering students, and to selected faculty on intellectual property management.

RMCR staff encouraged researchers participating in corporate visits to disclose inventions to the UIRF and be alert about issues regarding disclosure, confidentiality and impact on patent rights.

RMCR staff facilitated, where necessary, the execution of confidentiality agreements by corporate partners prior to their campus visit.

Oakdale staff met with collegiate deans to exchange information and explore opportunities for expanded faculty

interaction with the UIRF, TIC and ORP. Meetings with other deans will be pursued in FY 2000.

UI policies and procedures and other relevant technology transfer information are readily available on a World Wide Web site. An improved Web site is being designed and will be operational in FY 2001.

UI VP Research units initiated and sustained collaborations with the Office of University Communication and Outreach and Health Science Relations to produce informational materials and articles for the internal UI publication "fyi," "Spectator," "Illumine," and the "College of Medicine News." In particular, University News Service was especially important in communicating news of UI technology transfer activities. A focus in FY 2001 will be to strengthen working relationships with Health Science Relations and Alumni Association publications.

Goal II. Ensure maximum coordination of formal technology transfer activities with other, more broadly based, corporate relations activities.

Objective A: Make use of UI/UI Foundation Steering Committee to maximize coordination of related initiatives.

Action: The coordinating function was refined and moved to the University Vice Presidents Group, a group that now includes the President of The University of Iowa Foundation.

Action: RMCR actively identified opportunities for the UI to take a more integrated approach to enhance research funding to leverage various sources of funding (corporations, federal agencies, science-based philanthropic foundations, etc.) for targeted research programs.

RMCR extensively utilized resources, especially funding search capabilities, existing within the Division of Sponsored Programs.

RMCR presented its new initiatives to the Private Foundations Working Group and has facilitated (or participated) in activities so that such coordination occurs between the VPR units and the UI Foundation.

RMCR identified a new funding opportunity for which a proposal was submitted by a UI political science professor to this philanthropic foundation.

Neither the "Key Corporate Partner" program nor the UI/UI Foundation Steering Committee exists at this point.

Goal III: Increase technology transfer activities by increasing the number of corporate research contracts.

Action: Over the last year, corporate sponsored research funding was \$33.1 million, the second-largest total in UI history. Over the past five years, corporate-funded research totaled \$154.3 million or a mean of \$30.9 million per year. The generally increasing trend ranged from a low of \$25.3 million in 1996 to a high of \$40.1 million in 1999.

Action: RMCR organized a number of campus visits by corporations to facilitate new alliances.

Objective A: Manage corporate contacts efficiently and effectively; respond to all within three working days

Action: During the year staff in the UI Division of Sponsored Programs (grants and contracts office) and the Clinical Trials Office successfully negotiated 365 corporate research agreements. Over the past five years, corporate research agreements totaled 1,781 or a mean of 356 per year. The generally increasing trend ranged from a low of 290 in 1996 to a high of 381 in 1999.

Action: Referred inquiries from corporations in a timely and efficient manner to relevant faculty, staff or academic centers.

Objective B: Develop materials which describe UI areas of research strength.

Action: RMCR developed -- and continuously updates -- marketing materials that describe in a concise manner, both in hard copy as well as on the website : UI bioscience strengths, research units, interdisciplinary research centers and institutes of excellence.

Action: Developed materials that promote UI projects in early-stage research.

Objective C: Increase the publication of information about UI research without a corresponding increase in cost.

Action: RMCR focuses on the development of updated "desk-top" materials about UI programs.

Action: The "desktop brochures" described above are both more flexible and less expensive than "printed" brochures. Significant printing as well as postage expenses have been saved because of our increasing use of the Internet as a resource for internal and external constituencies.

Objective D:

Participate in pharmaceutical industry trade and professional meetings. Initiate relationships with pharmaceutical manufacturers as opportunities arise.

VPR staff participated in numerous industry/trade/professional meetings during the past year:

- **BIO'2000 (in cooperation with the IDED and ISU)**
- **Licensing Executives Society Annual Meeting**
- **Assoc. of University Technology Managers Annual Meeting**
- **AUTM Software Meeting**
- **Iowa Biotechnology Association**
- **Iowa Technology Transfer Conferences**
- **Software and Information Technology of Iowa**
- **Iowa Human Resource Recruitment Consortium**
- **Iowa Life Sciences Advisory Committee**
- **Future of the Pharmaceutical Industry conference at MIT**
- **Strategic Pharmaceutical Partnering**
- **Center for Biocatalysis and Bioprocessing Annual Meeting**

Each of these meetings provided opportunities for UI technology transfer personnel to meet face-to-face with research and business development personnel from industry to promote University of Iowa opportunities for sponsored research, licensing of technologies, business location, and related activities. At the request of Congressman Jim Leach, the UIRF Director prepared a white paper on the Ethics of Gene Patenting, and organized a follow-up small group discussion with selected UI faculty for the Congressman and staff.

Objective A: Increase the annual number of invention disclosures made to the UI Research Foundation.

Action: In the five years from FY 1996-2000 the UIRF received 413 invention disclosures, yielding an annual mean of 82.6 and generally an increasing trend from 74 (1996) to 90 (1998). In FY2000, the UIRF received 84 invention disclosures from faculty and staff.

Objective B: Increase the efficiency with which the UIRF engages external attorneys.

Action: In cooperation with the UI General Counsel's office the UIRF continued to solicit statements of capabilities and billing rate statements from law firms around the US in an effort to both match the technical expertise of engaged attorneys to UI inventions and to limit expenses for the delivery of legal services.

Objective C: Increase the rigor with which decisions to obtain or not obtain patent coverage of disclosed inventions are made.

Action: Patent opinions are sought early and where appropriate, early commercial interest is sought before the patenting decision is made.

Objective D: Increase the number of licenses executed by the UIRF.

Action: In FY 2000 the number of licenses and options executed was 27, compared to 21 in FY 1999, 22 in FY 1998, 25 in FY 1997 and 15 in FY 1996. Some licenses generated important research funding for UI labs.

Objective E: Increase the operating efficiency of the UIRF.

Action: During FY2000, the UIRF purchased a commercial database to help it monitor and track the status of prosecution and commercialization of UIRF cases. Efforts are underway to get historical and new information entered into this new database system. At the recommendation of the UIRF's internal auditors, the UIRF also purchased a customized accounting database that has resulted in eliminating the duplicate entry of accounting information, entry into manual accounting ledgers, and significantly reduced the staff effort needed to carry out the UIRF's primary accounting functions.

Objective F: Maintain ability to serve UI research interests by adding professional staff in such selected areas as software management.

Action: The UIRF filled one licensing associate position in early FY 2000, and conducted a successful search for a second licensing associate to help the UIRF manage its increasing portfolio. The UIRF also received approval to hire a Secretary II, supplementing the UIRF's support staff. UIRF support staff is playing an increasing role in helping to manage the institutional portfolio, and provides significant assistance to UIRF licensing personnel.

Action: RMCR appointed a new director and assistant director in FY 2000.

Goal V: Encourage creation of new businesses able to take advantage of UI resources.

Objective A: Encourage business start-ups at UI Technology Innovation Center.

Strategy 1. Increase ability to deliver services to start-up firms without increasing budget of Technology Innovation Center.

Action: Broaden network of potential providers of business services to include John Pappajohn Entrepreneurial Center, local/regional accounting offices, local/regional banks, independent consultants.

The TIC is an active member of the National Business Incubator Association

The TIC accepted five new tenant companies and graduated three tenant firms in FY 2000.

The TIC involved the Small Business Development Center and the John Pappajohn Entrepreneurial Center in application reviews and consultation, and expanded the networks of potential business and professional service providers for tenant firms. In partnership with the SBDC, the SBA and the local business community, the TIC explored the feasibility of establishing an SBA Business Information Center in TIC to serve TIC companies and other small firms. The TIC accepted five new tenant firms in FY 2000.

Action: Maintain close ties with venture investors.

The TIC promptly assisted venture groups seeking investment opportunities in accessing information on the TIC and tenant firms.

Technology Transfer Staff members participated in Venture Network of Iowa briefings, and met on campus with interested venture capitalists, angel investors and investment bankers. Representatives of Cybus Markets, Itasca and Equity Dynamics met with technology transfer staff and TIC incubator companies.

The UI has publicly cited the following firms that have invested in University-affiliated companies: Equity Dynamics, Medical Science Partners, Allstate Venture Capital, Medtronics, Inc., Iowa Capital Corp., Iowa Seed Capital Corp., The Cedar Rapids Gazette, Liberty Partners, Start-ups Unlimited, the Wright Group, Qiagen G.m.b.H., SAI International, Albany Molecular Research, Inc., McGraw-Hill Publishing and LMS.

The 17 TIC tenant firms and 15 expanded "graduate" firms have attracted private capital more than 20 times greater than the state's investment in the TIC since it was established in 1984.

Strategy 2:

Improve work environment for Technology Innovation Center affiliates.

Action: Develop series of presentations on business topics of interest to TIC affiliates.

Tenant firms were invited to meetings and seminars of potential interest, and participated in targeted presentations by area and state business development leaders including Venture Network of Iowa presentations, a state conference on business startups sponsored by the entrepreneurial centers, an annual seminar on biocatalysis and bioprocessing, and a state "software summit." Given the number of TIC and ORP firms engaged in biotechnology and software development, the UI is a member of the Iowa Biotechnology Association and the Software and Information Technology Association. Senior staff of TIC affiliates serve as directors for both associations.

Action: Provide additional opportunities for more structured interaction among tenant firms.

Using a combination of referrals and personal introductions, along with informal settings such as tenant welcoming receptions and coffees, TIC promoted focused interaction among tenant firms on topics such as human resources and SBIR funding opportunities.

Action: Identify needs of affiliate companies.

Tenant firms met individually with staff to identify desired improvements in the work environment within budget constraints. Responding to an urgent need, Information Technology Services provided selected TIC tenants with improved Internet connectivity. The entire TIC building will be wired for improved connectivity in FY 2001-2002. A plan to improve campus safety through better exterior lighting was implemented as funds permitted. The bike/hiking trail was completed to North Liberty. University landscapers and groundskeepers received an award for initiative and diligence in campus beautification.

Strategy 3: Assure ability of Technology Innovation Center to serve laboratory-based firms.

Action: Work with UI administration to maintain quality and quantity of laboratory space assigned for use by TIC.

The UI committed institutional funds to construct a building shell with the expectation that the Iowa Department of Economic Development would award \$500,000 in Advanced Research Commercialization (ARC) program funds to provide much-needed flexible wet laboratory space for TIC biotech tenants. The College of Medicine and the Center for Biocatalysis and Bioprocessing agreed to continue temporary assignment of academic research space for use by TIC firms. Additional funds must be identified to enable a substantial increase in lab space for incubator companies.

Strategy 4: Maintain programmatic ties between Technology Innovation Center and Oakdale Research Park.

Action: Of the seven private firms with a presence on the Oakdale Research Park, five are "graduates" of the Technology Innovation Center. One current TIC affiliate firm, EnzyMed Division/AMRI, began construction of a laboratory facility on the Research Park in late FY 2000. Breakthrough to Literacy, Inc. and Police Law Institute "graduated" from the TIC and expanded on the Research Park in FY 2000.

Objective B: Support local, regional and state efforts.

Strategy 1. Plan and deliver a series of educational programs on commercializing technologies.

Action: Technology Transfer Staff have developed a collection of slides and modular scripts which can be used to make customized presentations efficiently and effectively.
(see Goal 1, Objective C)

The John Pappajohn Entrepreneurial Center has undertaken major efforts to support start-up businesses. Several start-ups supported by the John Pappajohn Entrepreneurial Center have become tenants in the TIC.

Strategy 2. Assist the State and other economic development groups in evaluating the need for venture capital funds accessible to Iowa firms.

Action: Several UI offices have been involved in efforts of the Venture Network of Iowa, the Iowa Department of Economic Development, Iowa City Area Development Group, Priority One (Cedar Rapids), the Corridor Committee (IC/C/CR), and the Iowa Area Development Group, among others, to develop new sources of capital for Iowa firms, particularly those in high technology businesses which require high initial investments. UI offices participated in meetings with Cybus Capital, Equity Dynamics, and Aavin Equity Partners, among others.

Strategy 3. Encourage UI business relationships.

Action: Several UI offices have been involved in the State's efforts to develop Vision 2010 to better position Iowa's participation in the "new economy." Several UI officials have encouraged an increasingly wider range of UI interaction with the Iowa business community.

Action: RMCR facilitated several discussions between corporate representatives as well as UI researchers, UI tech transfer staff, UI career placement officers, UI external relations directors and UI students.

Action: RMCR developed a plan to undertake outreach/site visits to Iowa companies. Implementation of this plan began in June 2000 and involves site visits to approximately 4-6 companies each month. It has already resulted in (a) two company projects being undertaken by UI MBA students, (b) a speaking arrangement for a UI career placement officer at the monthly meeting of a large group of HR directors of companies located in southeast Iowa, and (c) a proposal for air quality assessment, submitted to a startup firm in West Liberty by the College of Public Health (WORKSAFE Iowa

program).

Action: RMCR cross-functionally collaborates with the Communications and Outreach office of University Relations to utilize and in turn enhance its "Iowa Connections" database.

Action: RMCR provided IDED and ICAD with UI literature pertaining to their site prospects.

Action: RMCR facilitated meetings of TIC companies and groups such as Software & Information Technology of Iowa (SITI) and the Iowa Human Resource Recruitment Consortium (IHRRRC).

Goal VI: Encourage business location in Iowa

Objective A:

Attract research-based firms to Oakdale Research Park (ORP) and to the local community to encourage linkages between UI research resources or needs with complementary needs or resources in the private sector.

Strategy 1.

Ensure consistency between academic initiatives and growth plans for ORP.

Action: Provided support required to make successful UI Oakdale-sited "anchor centers" including: the Center for Biocatalysis and Bioprocessing, Center for Advanced Drug Development, National Advanced Driving Simulator.

The appendix contains specific information on the activities of the "anchor centers" themselves. Highlights from the last year include:

- The National Advanced Driving Simulator apparatus was installed in the new facility and NADS was being readied to become fully operational in FY 2001.
- Expanded activity with industry by the Center for Biocatalysis and Bioprocessing.
- Expanded activity with industry by the Center for Advanced Drug Development
- Final planning and start of construction of a major expansion of the Multi-Tenant Facility which houses

**the Center for Biocatalysis and Bioprocessing and
Human Health and Medicine anchor laboratories.**

Strategy 2. Maintain a physical environment at ORP that will encourage corporate location on the Park

Action: Provide a consistent appearance of the ORP and Oakdale Campus by (a) landscaping the Highway 965 frontage and (b) redesigning the entrance on Oakdale Boulevard.

A new municipal water line at Oakdale will enable improved service to the surrounding area, while paving a segment of Holiday Court at Oakdale Campus expense will improve Park tenant access. Additional plantings along Oakdale Boulevard near Crosspark Road provide a more esthetically pleasing first impression of the Park. A newly designed entrance way to the Park awaits funding.

Action: Provide exercise amenities associated with a bike trail through ORP.

In FY 2000 the City of Coralville completed construction of the final bike trail link to connect with the North Liberty bike trail north of the Oakdale Research Park. The overall project was co-funded by the City, ORP, and the UI with the majority of the costs borne by a grant from the U.S. Department of Transportation.

Action: Assure adequate east/west traffic flow through ORP in consultation with the City of Coralville.

In FY 1997 Oakdale Boulevard was extended so that it now connects Highway 965 with Coralville's 12th Avenue extension. This action results from co-planning and co-funding between the City, the ORP and the University in accord with the Park's master plan. A second phase of Oakdale Boulevard east of the Park was completed in FY 1999. A third phase completed in FY 2000 provides access to North Dubuque Street in Iowa City and further Oakdale Boulevard construction is planned in FY 2001-2002. All will further enhance access to the Park.

Strategy 3. Increase public prominence of ORP

Action: Work with offices of University Communication and Outreach, Health Science Relations, and Research Marketing and Corporate Relations to identify outlets for news and feature stories on ORP and ORP tenants. University News Service staff were especially diligent in service and consultation in FY 2000.

Over the past year dozens of stories and features on the ORP and its tenants have appeared in the print and broadcast media. Examples of publications include: Chicago Tribune, Albany (NY) Times-Union, Salt Lake City Tribune, Business Week, The Cedar Rapids/Iowa City Gazette, Iowa City Press-Citizen, Des Moines Register, BioWorld Today, The Daily Iowan, Community News Advertiser, Des Moines Business Record, Genetic Engineering News, New York Times, Los Angeles Times, U.S. News & World Report, Wall Street Journal, and Automotive Technology. The ORP was also featured in area Chamber of Commerce publications, UI publications fyi and Illumine, UIHC news bulletins, and a UI football program.

Action: Hold public or service events at ORP as opportunities arise

Over the last year the ORP has been host to events, tours and briefings for the Governor, both U.S. Senators and the district's Congressman and staff, legislative leaders, Regents, and visiting international academic and business representatives from Iowa and elsewhere in the U.S. as well as Korea, Japan and Armenia. The ORP coordinated a public building dedication and reception for 150 guests celebrating completion of the new Breakthrough to Literacy, Inc. facility where U.S. Senator Harkin and Iowa First Lady Christie Vilsack were featured speakers.

Selected ORP and TIC firms made presentations at Area Chamber of Commerce events.

Objective B:

Support local, regional and state initiatives in business development.

Action: Technology Transfer personnel participate in state and area economic development boards and committees, including the Iowa Department of Economic Development, Iowa City Area Development, Corridor Committee, and Priority One.

RMCR maintains strong ties with State industry trade associations (IBA and SIT) and other local/regional economic development groups.

RMCR staff serve on the following Boards and/or participate in activities of the following groups on behalf of the VPR:

**Iowa Biotech Association
Iowa Human Resource Recruitment Consortium
Iowa Rural Development Council
Iowa Business Council
UI Small Business Development Center**

RMCR staff represented UI at Governor Vilsack's HRRC alumni receptions in Los Angeles and Chicago.

RMCR, ORP and CBB staff joined with representatives of IDED, ISU and other state institutions to promote Iowa's strengths in pharmaceuticals and biotechnology at the annual BIO meeting.

Strategy 1.

Respond to all economic development requests for proposals with high quality UI materials within the timeframe agreed upon with the economic development group.

Action: The University takes a very active role in assisting communities in their efforts to attract new businesses to the state. Technology Transfer staff work closely with economic developers throughout the state to identify strengths of the University which are relevant to businesses considering locating facilities in Iowa.

ORP and TIC staff met or consulted with business development representatives from Iowa City and North Dakota State University concerning the feasibility of establishing business incubators in those communities.

The ORP and the TIC work closely with state and community economic development groups to identify qualified corporate prospects for the Park and the business incubator, to coordinate the flow of relevant ORP and TIC information to prospect companies, and to manage site visits to the Park and incubator.

ORP and TIC staff worked with Coralville, ICAD, Iowa Area Development Group and the IDED to submit proposals to four biopharmaceutical firms seeking locations for research and production facilities.

In FY 2000 the Park continued to work with a consultant to enhance its World Wide web site and provide better access to UI technology transfer information.

Strategy 2. Develop and coordinate execution of a UI plan for developing the Iowa pharmaceutical industry.

Action: The new Dean of the College of Pharmacy has broad, extensive experience in industrial relationships. His arrival has reinvigorated UI interactions with the pharmaceutical industry. The UI participates in State and regional efforts to develop the Iowa pharmaceutical and related biotechnology industries. Iowa currently has more than 60 companies in these fields. The goals of this effort include:

- Expand the existing Iowa industry.
- Assist in establishing new pharmaceutical start-up companies.
- Attract expansions of manufacturing operations for existing U.S. and foreign-based pharmaceutical companies, and
- Conduct targeted marketing within niche segments in which Iowa has the best opportunity to gain and maintain a competitive advantage in excipients, which can be produced from Iowa agricultural products, and biopharmaceuticals, which utilize Iowa agricultural products and biocatalysis and bioprocessing expertise.
- The UI is represented on the board of the Iowa Biotechnology Association
- The UI works closely to provide the IDED with UI information. UI is represented on numerous IDED advisory committees as well as on the IDED Board of Directors.

The Oakdale Research Park and RMCR co-sponsor and coordinate the UI exhibit booth at the annual BIO meeting in cooperation with the IDED

Based on renewed interest from Jordan Cohen, the new dean of the College of Pharmacy, RMCR managed the first phase of internal deliberations to examine the feasibility of

establishing an FDA-approved cGMP biologicals manufacturing facility.

Goal VII. Maintain consistency between academic planning and planning for technology transfer.

Objective A: Obtain advice from senior academic officials on emerging UI research strengths and develop technology transfer initiatives as appropriate.

Action: Such consultation occurs on a frequent basis. RMCR staff participated in early deliberations on the Math, Computational and Information Sciences initiative and serve on the Informatics Study Committee.

Objective B: Create a plan by January 1, 1998 to develop the broad range of possibilities which might emanate from the location of the National Advanced Driving Simulator at the Oakdale Research Park.

Action: Preparation of the plan is underway.

APPENDIX

CONTENTS

- * Center for Biocatalysis and Bioprocessing
- * National Advanced Driving Simulator
- * Center for Advanced Drug Development
- * Research Marketing and Corporate Relations
- * Technology Innovation Center
- * Oakdale Research Park
- * University of Iowa Research Foundation

Appendix: University of Iowa Technology Transfer Offices and Anchor Centers

As noted in the body of the report, the UI maintains four offices which have responsibilities for technology transfer interactions with the business community. Consistent with strategic planning, a set of "anchor centers" was established at Oakdale. Descriptions of these offices and centers are provided here.

The Center for Biocatalysis and Bioprocessing (CBB)

The CBB is a multidisciplinary research group with a primary focus on biocatalysis and bioprocessing. Consisting of 50 faculty members and over 300 researchers from seven different university departments, the group is widely regarded as the best in the nation in this specialty.

The Center's national prominence is clear from the receipt of more than \$2.2 million in highly competitive biotechnology training grants from the National Science Foundation and the National Institutes of Health. UI researchers associated with the Center attracted more than \$15 million in federal and corporate research support in FY 1999 giving further strong evidence of the competitive standing of the group.

The CBB laboratory in the UI Oakdale Research Park continues to expand collaborative efforts with industry. Enabled by special appropriations from the State of Iowa, the Center completed the installation of necessary equipment, and assembled an experienced staff. The unsurpassed facility consists of highly-instrumented fermentors ranging from 2 - 1000 liters plus downstream processing and analytical equipment.

The CBB helps the industrial biotechnology community research optimize and scale-up fermentation processes, and provides other contract services. The laboratory grows and processes "engineered" bacteria, yeasts and filamentous fungi.

During the past two years, the CBB helped more than 60 companies develop new products and refine processes. Many of these companies are linked to the state of Iowa. CBB-industry projects have included production of food and feed ingredients, enzymes, pure peptides, plasmid DNA, pathogens for medical research, antibiotics, recombinant proteins, and bacterial and yeast cells.

The Center's outreach programs include an 9th annual conference to be held October, 2000. Scientists from more than 28 nations and 28 states have visited Iowa in connection with this conference. In addition, CBB staff currently serve on the Life Sciences Subcommittee of the Iowa Technology Initiative and as advisors to the Bioprocess Technology Program, a 2 year degree program in biotechnology and fermentation at Indian Hills Community College.

The CBB's laboratory facilities are also used by biotechnology-related, start-up companies through the UI Technology Innovation Center (TIC). At the present time, EnzyMed Inc. is leasing space and equipment within the CBB laboratory.

National Advanced Driving Simulator

The National Advanced Driving Simulator (NADS) is one of four "anchor centers" on the Oakdale Research Campus. NADS is a joint project of the Department of Transportation, the State of Iowa and The University of Iowa. When complete in the fall of 2000, NADS will be an internationally unique, and the most advanced, simulator for conducting human-centered driving safety research in a highly re-configurable computer generated environment. The primary mission for NADS is to conduct and support NADS-based research to assist the National Highway Traffic Safety Administration (NHTSA) of the Department of Transportation in obtaining fundamental understanding of cause and effect during routine and critical crash avoidance maneuvers, determining the limits of operator performance, improving vehicle design and highway systems that will significantly enhance the driving safety. A second mission is to conduct vehicle system engineering research with government and industry to enhance the productivity of the automotive manufacturing sector.

NADS staff is supporting two research projects of national significance that have been included in NHTSA's plan for experiments using the NADS in FY 2001. The first project will study the effects of blood alcohol content on driving performance and the second will study the effects on safety when drivers use, for example, cell phones, on-board computers, internet services, e-mail, faxes, and navigational devices. These two projects are also examples that can only be conducted safely, repeatedly and under controlled conditions in the simulator. NADS staff is also working diligently to develop enabling technology for users from the automotive, agriculture, construction, and military sectors as well as medical community, and to attract users to use the Simulator.

NADS, jointly with the VRAC (Virtual Reality Applications Center) at The Iowa State University, are pursuing support for advanced simulator networking research for vehicle and equipment distributed product design. This project aims at linking, through the ICN, VRAC and NADS with industrial quality, agricultural equipment design test cases that will be provided by Deere & Company. Benefits and challenges of networking of VRAC and NADS environments will be studied. This project will also enable the engineers to gain unique insight into the operation of the vehicle under realistic operating conditions, and to identify challenges and opportunities in information technology that are critical to the networking of operator-in-the-loop simulator environments and virtual reality – an area which holds potential for economic development in the state.

Center for Advanced Drug Development (CADD)

The Center for Advanced Drug Development (CADD), established in 1992, is located on the University of Iowa Oakdale Research Campus and employs 15.5 full-time employees, one graduate student, and three undergraduate students. CADD operates under the umbrella of the University of Iowa College of Pharmacy and its staff works in close collaboration with the faculty of the College. CADD has the capability to engage in the full range of the drug development process by calling upon the resources of the UI Division of Pharmaceutical Service, the Center for Biocatalysis and Bioprocessing and the Iowa Drug Information Network. Collectively this expertise offers a unique Research and Development partnership with the Pharmaceutical and Biotech industry. The Center offers an excellent resource to enhance technology transfer and attract/develop new industry to Iowa. Outsourcing to CADD allows our clients to shorten the lead time between new pharmaceutical discoveries in the laboratory and their commercialization in the marketplace.

The Center offers contract services which complement those of the Division of Pharmaceutical Service. More particularly, the Center offers non-production services relevant to the clinical trials process. Services include: management of FDA relationships for client firms (especially in the processing of new drug applications), development and execution of new chemical assays for a candidate new dosage forms and new chemical entities, technical transfer of assay methods, development and execution of stability studies of dosage forms, and testing of active pharmaceutical ingredients/excipients for compliance. During the 1999-2000 fiscal year, CADD performed technical transfers on 20 incoming and 7 outgoing methods.

Through the Division of Pharmaceutical Service, the UI College of Pharmacy offers the special capacity to produce under contract limited quantities of new medicines under FDA approval and utilizing an FDA registered facility (the only such comprehensive facility in a College of Pharmacy in the U.S.). The capacity is particularly valuable to firms wishing to bring new products through clinical trials.

The Center's services are geared to benefit the following types of clients:
Small or medium-sized pharmaceutical companies which do not typically have an extensive scientific staff or facilities to perform the studies CADD provides

Veterinary pharmaceutical companies

Biotechnology companies

Large pharmaceutical companies which periodically lack the capacity to pursue all projects internally

Medical departments that require stability studies on new drugs or drug products under investigation

International pharmaceutical companies that seek to market a drug in the United States

Governmental agencies

The client base includes three pharmaceutical/veterinary companies, three biotechnology companies and two excipient manufacturing companies from Iowa, 13 companies from surrounding Midwest states, 32 companies from elsewhere in the USA, one company from Canada and two companies from Europe.

CADD's accomplishments since 1992 are as follows:

remodeled 4300 additional square feet since its inception in 1992 and occupies a total space of 5825 square feet

added a local area network for added security of client data and efficient report generation

presented nine research posters at five international meetings

worked with a total of 58 local, national, and international clients

added an in-house quality assurance program which is Current Good Laboratory Practices (GCLP) and Good Manufacturing Practices (GMP) compliant

marketed the joint capabilities of CADD and the Division of Pharmaceutical Service by exhibiting at the national American Association of Pharmaceutical Scientists' annual meetings

developed an Internet homepage to reflect new capabilities to current clients and information to prospective clients

strived to update instrumentation and software to offer unique services

For additional information please contact: <http://www.uiowa.edu/~cadd>, e-mail Dr. Alta Botha, Laboratory Director, alta-botha@uiowa.edu, or phone 319-335-4096.

Research Marketing and Corporate Relations

The Office of Research Marketing & Corporate Relations (RMCR) acts primarily as a research-related university-corporate interface for the University of Iowa (UI) and reports jointly to the Vice President for Research and the Vice President for University Relations. Initially established as the Office of Research Marketing in 1993, RMCR advances UI's research, teaching and service missions.

RMCR's broadly defined mission is to enhance research funding and technology transfer. RMCR promotes UI programs among corporate and other constituencies to better position the UI at the local, national and international levels. RMCR seeks to synergize efforts among various internal and external parties to help attain larger UI institutional goals in an increasingly dynamic, interdependent, global environment.

RMCR works with faculty, staff, academic centers and administrative units and the UI Foundation :

- To foster and facilitate cutting-edge, research-intensive alliances with corporations and leverage various sources of funding for selected research programs.
- To undertake outreach to Iowa corporations to match their business needs with capabilities within the University.
- To represent and showcase UI programs, capabilities and expertise to external constituencies through participation at conferences.

During FY 2000, a new RMCR Director and Assistant Director were hired. In addition to advising and assisting the VPR on several strategic initiatives, RMCR staff engaged in the following activities:

- (i) Organized numerous campus visits by corporations and State economic development agency personnel and facilitated faculty/staff meetings with potential corporate partners.
- (ii) Commenced implementation of a corporate outreach strategy to make 4-6 on-site visits per month to Iowa companies.
- (iii) Built and strengthened relationships with industry partners, scientific collaborators and other potential sponsors through active networking at meetings;
- (iv) Attended conferences to learn about emerging Research & Development sectors and disseminated key insights to relevant UI units.

- (v) Coordinated UI's participation in the annual BIO meeting in cooperation with the IDED to showcase UI research strengths and technology transfer programs including Oakdale Research Park, Technology Innovation Center, and the UI Research Foundation.
- (vi) Responded promptly to several external inquiries relating to ongoing research projects, licensable technologies, student internship opportunities, UI speakers, continuing education, and other matters.

To further UI's contribution to Iowa's economic vitality, the VP for Research has directed RMCR to support several State initiatives in the high-technology sector. RMCR staff have initiated and maintained strong ties with State industry trade associations, and local/regional economic development groups, including Board-level participation in: Iowa Biotechnology Association, Iowa Rural Development Council, UI Small Business Development Center, and the IDED/Human Resource Recruitment Consortium (including UI representation at Governor Vilsack's HRRC alumni receptions).

Technology Innovation Center

The Technology Innovation Center (TIC) was established in 1984 to foster the development of new technology-based business ventures. The center provides cost-effective office and laboratory space, access to shared office equipment and facilities, and assistance in establishing relationships with the University. Those relationships may include research sponsorship or collaboration, student or graduate employment, faculty consulting, and licensing of intellectual property. The center offers ready access to the University's computing facilities, research equipment and instruments, as well as advisory services on management, marketing, and finance.

Since its inception, the center has attracted companies created from the business strengths of Iowa, spin-off companies from research work at the University, and new research and development units of existing companies. Companies stay at the center for a limited time. Currently, 17 companies in residence at the center are preparing products and services in a broad range of fields, including:

- Information visualization
- Patient education software
- Drug discovery
- Interactive teleconference delivery
- Diagnostic assays for parasitic disease
- Dynamic image analysis
- Environmental engineering software
- Internet communications
- Optimization software development
- Antibacterial therapeutics

Fifteen "graduate" companies achieved their business goals after leaving the center.

Oakdale Research Park

The University's Oakdale Research Park was established in 1989. It is an important way in which the University works to attract firms to the State. The Park offers leased building sites and space to

businesses engaged in basic and developmental research, product development, and light manufacturing linked to research and development activities. By locating on the Park, companies requiring a sustained relationship with the University will benefit from their proximity to its research resources including faculty expertise, specialized equipment, and laboratory facilities.

The University encourages interaction between its faculty members and corporate tenants on the Park as a means of promoting both corporate and University research and the transfer of technology to and from the laboratory and the marketplace. "Anchor centers" sited at Oakdale are devoted to pharmaceutical development, industrial biotechnology, human health and medicine, and driving simulation.

The Oakdale Research Park is especially well-suited to accommodate the expansion needs of growing companies emerging from the University's Technology Innovation Center (business incubator).

Nineteen lots on the 189-acre Park are available for lease and development. Six projects on the Park include the Multi-Tenant Facility, which houses anchor laboratories for biotechnology and medicine, the LMS CADSI corporate headquarters, the Stockpoint, Inc. (formerly Neural Applications Corp.) headquarters, the Oakdale Systems, Inc. headquarters, the National Advanced Driving Simulator, and the four-building Myriad Technology Plaza, which houses The Stanley Group, Ascend Technologies, Police Law Institute, and Breakthrough to Literacy, Inc.

In FY 2000 Albany Molecular Research, Inc. (AMRI) acquired TIC incubator company EnzyMed, Inc. and began construction of a \$3.5 million laboratory that will enable the EnzyMed Division to expand in the privately-owned Myriad Technology Plaza on the Park. In late FY 2000, the University began a major expansion of the Multi-Tenant Facility laboratory complex. When the project is completed in FY 2001, it will add a 14,000 square foot laboratory and auxiliary space to accommodate rapidly growing research activities of the Department of Ophthalmology. The \$5.5 million project will be funded by corporate research grants won by UI investigators. The University is also constructing another 14,000 square foot addition that will provide speculative shell space for future build-out when funding is identified to provide much-needed wet laboratories for biotech "incubator" companies. Following the University's \$1 million investment in the building shell, the Iowa Department of Economic Development agreed to accept the Park as recipient of a \$500,000 Advanced Research Commercialization award to construct laboratories for incubator companies in part of the new building shell.

The University of Iowa Research Foundation (UIRF)

The University of Iowa Research Foundation was established in 1975 as a free-standing nonprofit corporation to manage inventions and intellectual property created at the UI. It does so by selectively obtaining patent or copyright protection for UI inventions or discoveries and by licensing these inventions to business and industry. Policy decisions for the UIRF are determined by a Board of Directors, selected from UI faculty and staff, members of the State Board of Regents, officers and directors of The University of Iowa Foundation and the public.

Objectives of the UIRF

Since 1987, the UIRF has been granted 237 patents. Specific objectives of the UIRF are to:

- Educate the UI community about issues concerning the protection of intellectual property

- Identify research with potential to produce new and useful knowledge which could be commercialized for the public benefit
- Disseminate new and useful knowledge resulting from University research through the use of the patent system
- Market patented technologies as well as those technologies being considered for patenting
- License patents to industry in order to promote the development and commercialization of inventions
- Assure that patent-related obligations to outside research sponsors and funding agencies are met

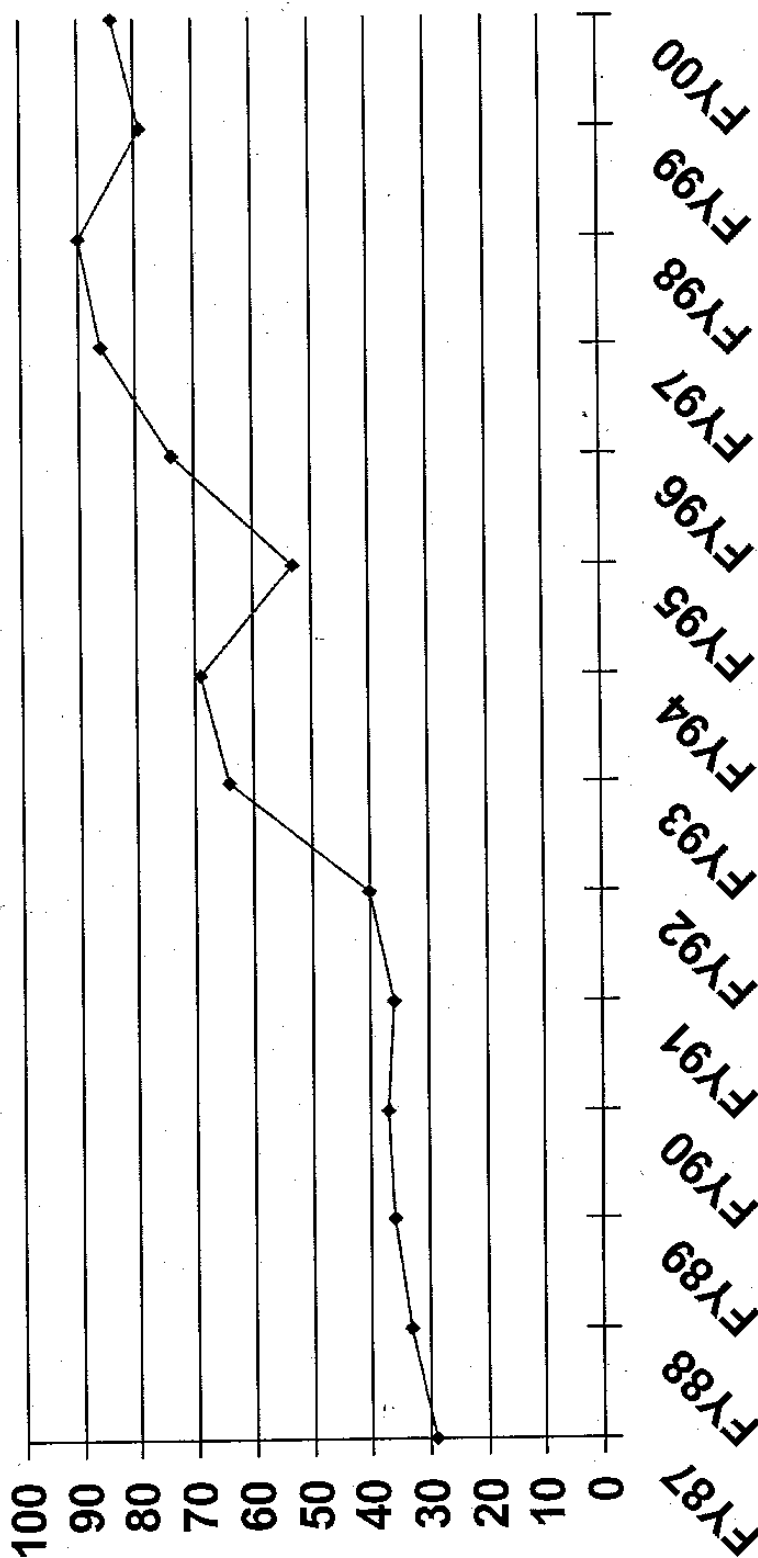
Patent Policy

To encourage and assist the University inventor in the use of the patent system in a manner that is equitable to all parties, the Board of Regents approved the University of Iowa Patent Policy. This policy requires that all faculty, staff, employees and students disclose to the UIRF all ideas, inventions or discoveries conceived or made during their employment or association with the University while using University time, materials or facilities. UIRF staff then determines what rights, if any, the University or any of its sponsors has to the idea, invention or discovery. With the UI Patent Committee as its advisor, the UIRF evaluates the invention and decides whether or not to pursue it further, based on these criteria: its patentability; its benefit to the public; its commercial potential; its scientific soundness and value; and its benefit to the University.

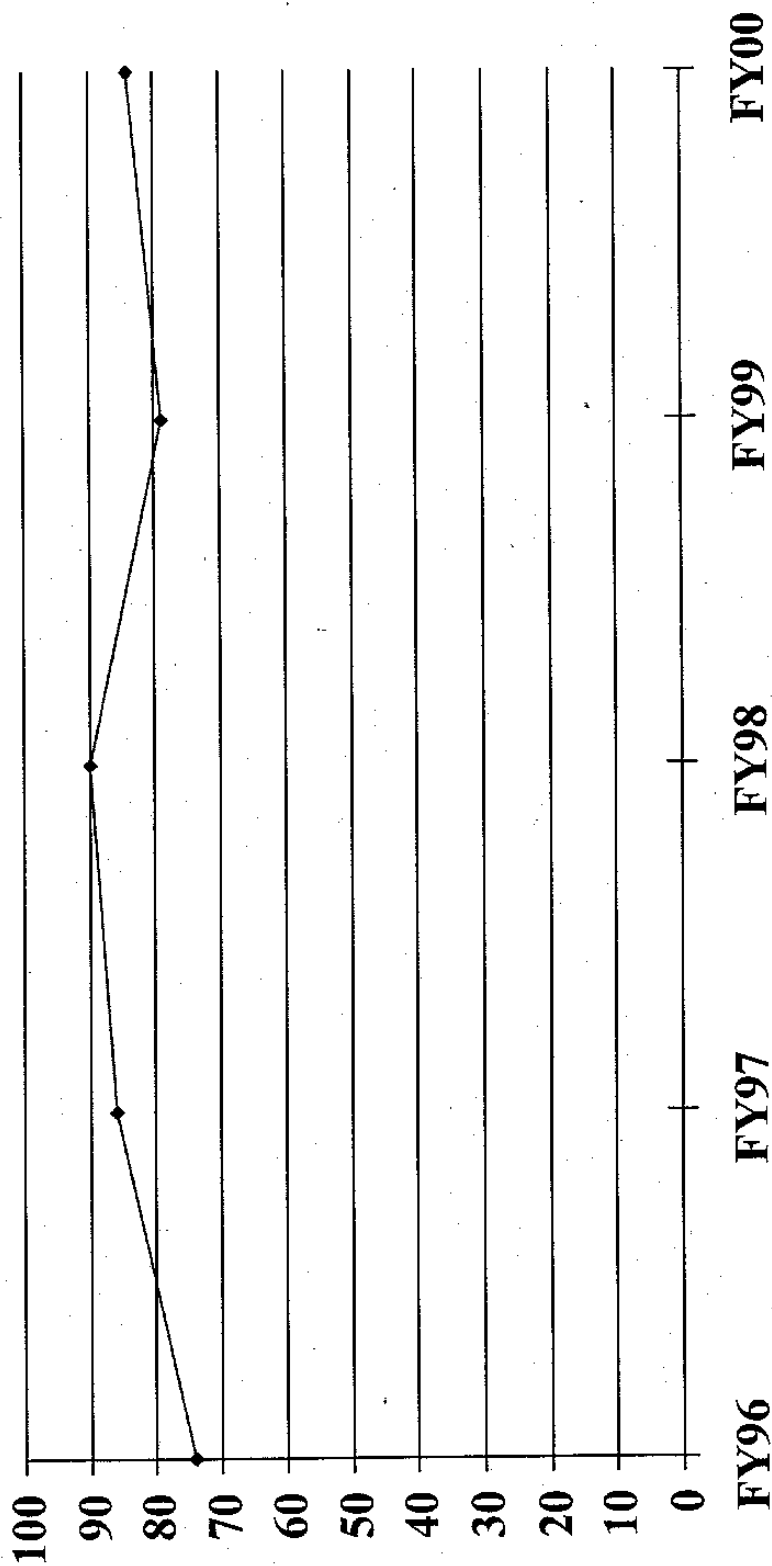
Licensing of Inventions to Industry

The purpose of licensing inventions to industry is twofold: (1) to provide a mechanism for transferring the results of University research to the public for the public benefit, and (2) to generate income for education and research. Net proceeds from licensing income are shared between the inventor and the University in accordance with the University of Iowa Patent Policy. Licensing activity may begin any time following disclosure and need not be delayed to allow a patent to issue. To ensure confidentiality and protection of non-patented technologies, an agreement is co-signed by the UIRF and the potential licensee prior to release of specific information about the invention. The UIRF maintains a summary of all patented and licensable technologies and distributes this information to the business community.

UI Research Foundation Invention Disclosures Received, FY87 to FY00 (Total Inv. Disclosures from FY87 to FY00=900)



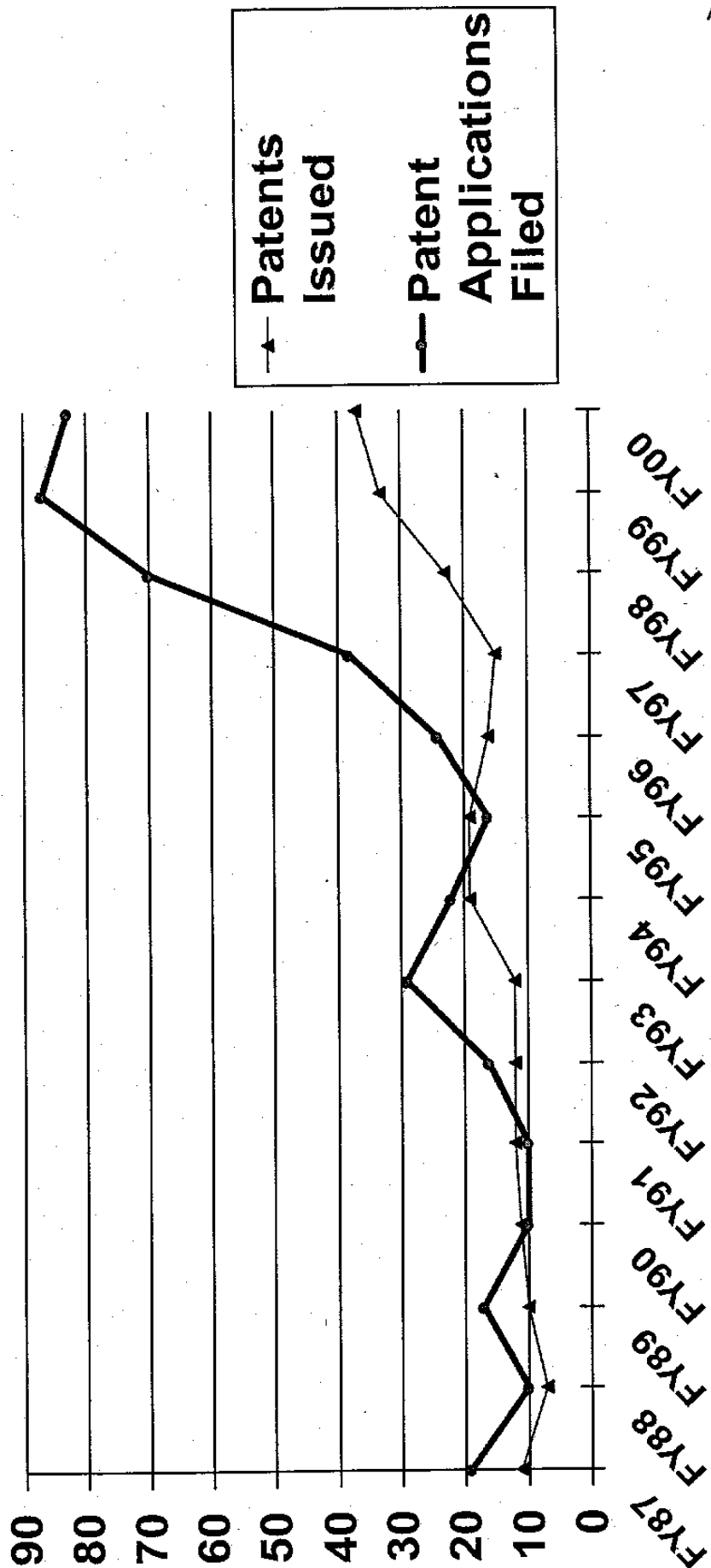
UI Research Foundation Invention Disclosures Received, 5 Year Trend (Total Inv. Disclosures from FY96 to FY00=413)



UI Research Foundation

Patents Filed & Issued, FY87 to FY00

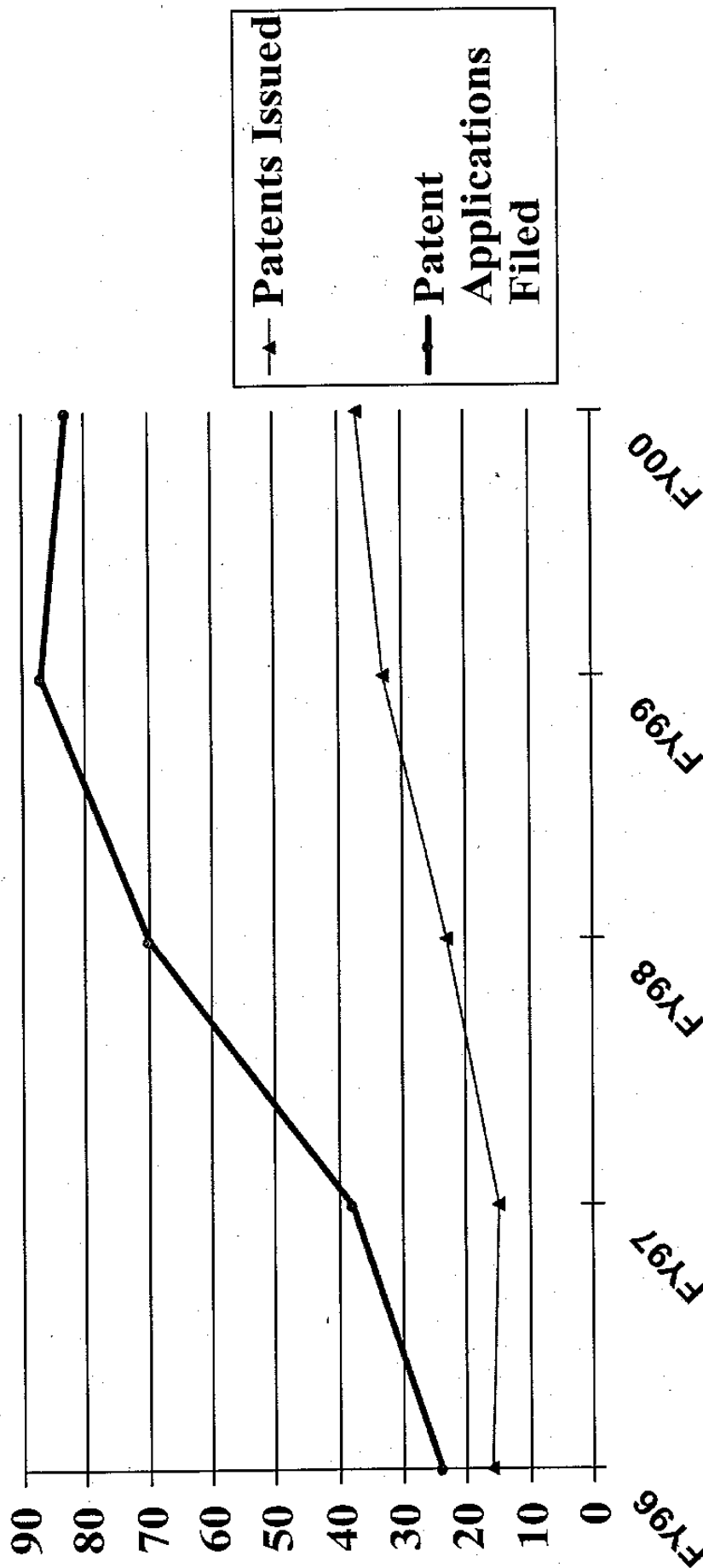
(Total No. of Patents Issued, FY87-00 = 237)
(Total Patent U.S. Applications Filed, FY87-00=451)



UI Research Foundation

Patents Filed & Issued, 5 Year Trend

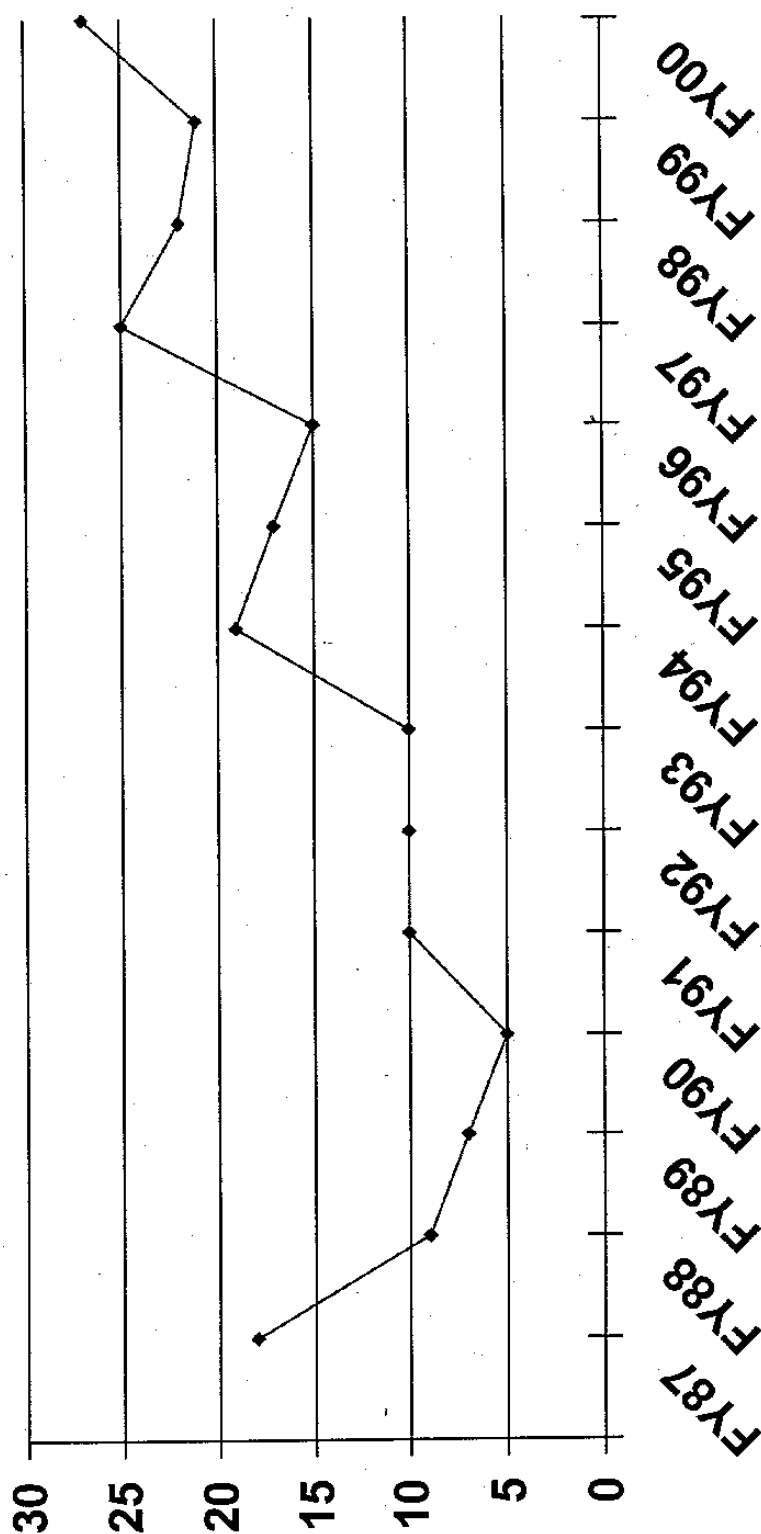
(Total No. of Patents Issued, FY96-00 = 124)
(Total Patent U.S. Applications Filed, FY96-00 = 302)



UI Research Foundation

Options/Licenses Executed, FY87 to FY00

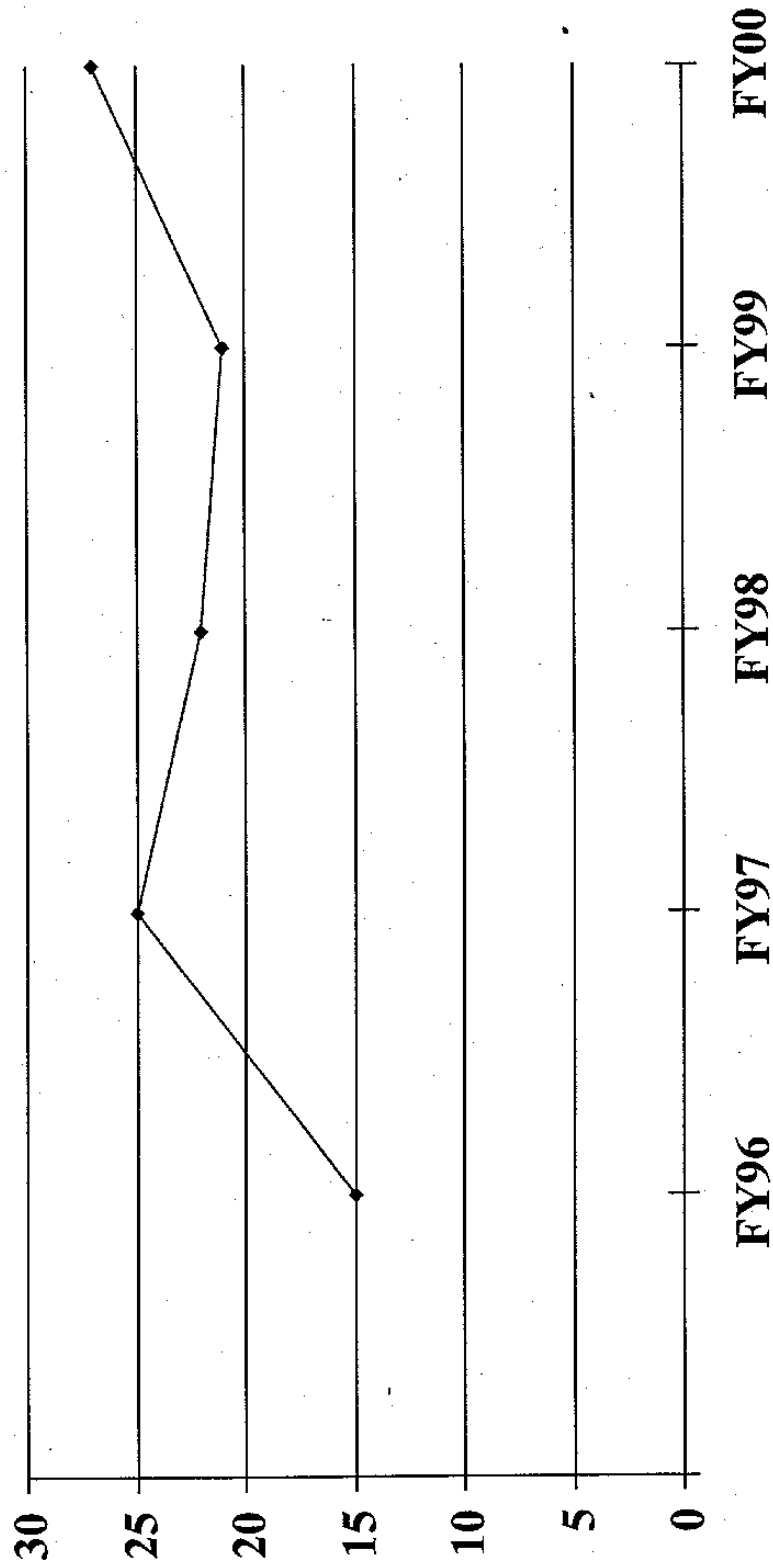
(Total Options/Licenses Executed, FY87-00=215)



UI Research Foundation

Options/Licenses Executed, 5 Year Trend

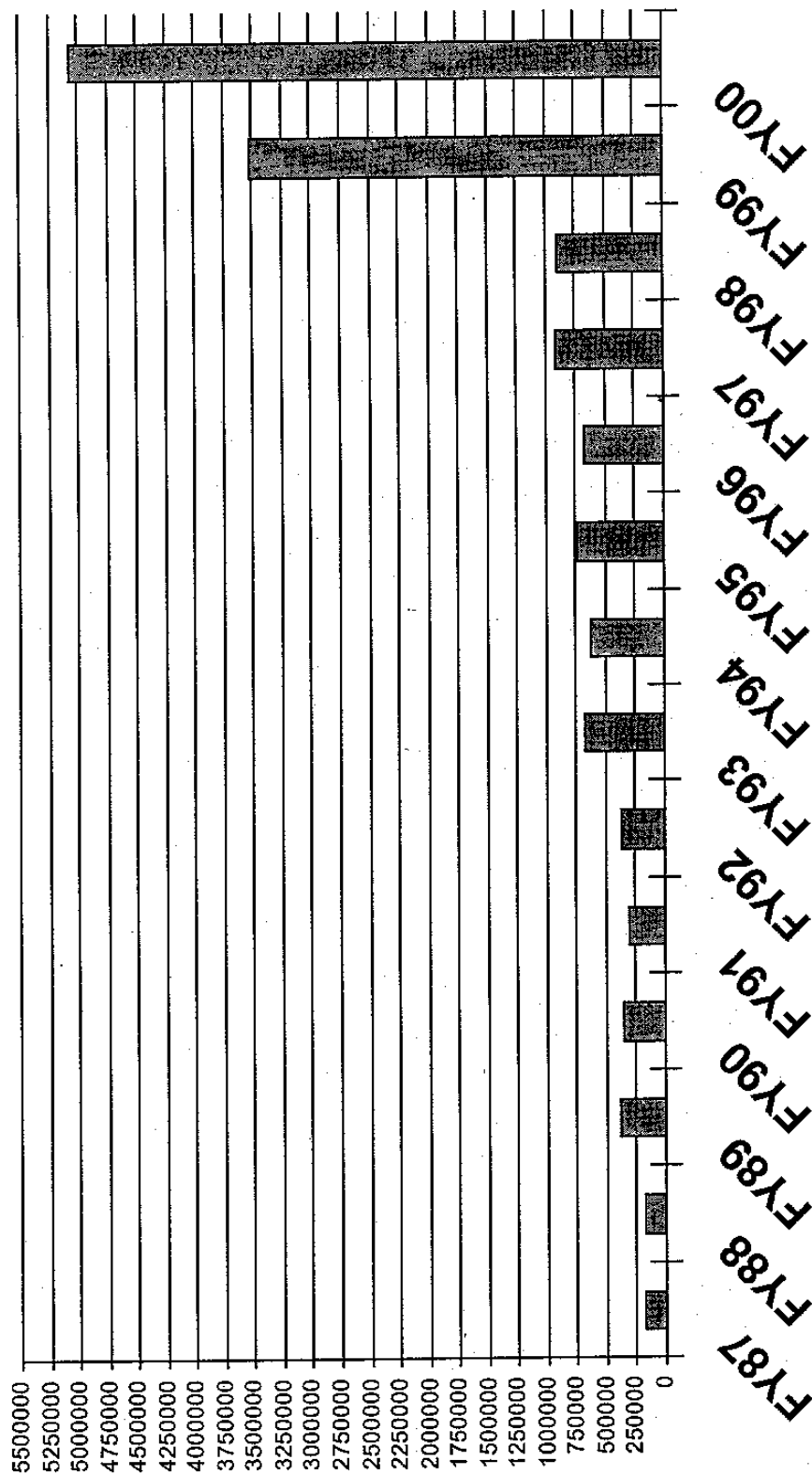
(Total Options/Licenses Executed, FY96-00=110)



UI Research Foundation

Total Income*, FY87 to FY00

(Total Income from FY87 to FY00 = \$14.8 million)

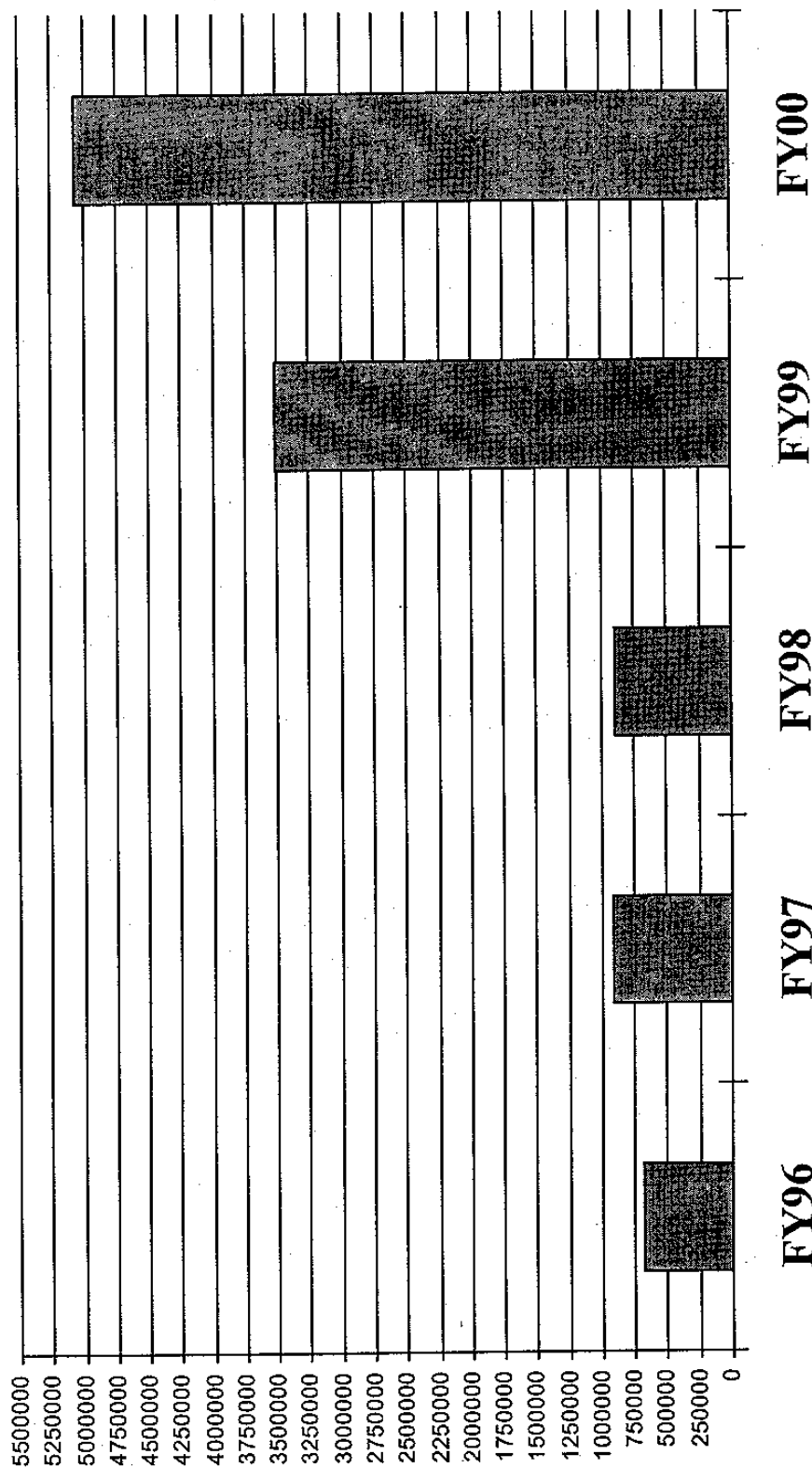


*This chart reflects UIRF earnings, patent cost reimbursements are not included.

UI Research Foundation

Total Income*, 5 Year Trend

(Total Income from FY96 to FY00 = \$ 11 million)



*This chart reflects UIRF earnings, patent cost reimbursements are not included.