Technology Transfer Advisory Committees

The UC San Diego Technology Transfer Advisory Committee (TTAC) is responsible for general oversight of the university’s technology transfer program. This standing committee is appointed by the chancellor and is chaired by the vice chancellor for research. It meets periodically to assess UC San Diego’s technology transfer practices and guides the overall direction of the program.

UCSD TTAC Members—FY10

Art Ellis (Chair)  
Vice Chancellor, Research
Amy Alexander  
Associate Professor, Visual Arts
David Brenner  
Vice Chancellor, Health Sciences
Michael Burkart  
Professor, Chemistry and Biochemistry
Lynelle Gehrke  
Associate Director, Office of Contract & Grant Administration
Michael David  
Professor, Biology
Steve Dowdy  
Professor, Cellular and Molecular Medicine
William Gerwick  
Professor, Pharmaceutical Science
Steve Kay  
Dean, Division of Biological Sciences
Jane Moores  
Assistant Vice Chancellor, Technology Transfer
Rosibel Ochoa  
Executive Director, William J. von Liebig Center
Jerrold Olefsky  
Professor, Medicine
Geert Schmid-Schoenbein  
Professor, Bioengineering
Frieder Seible  
Dean, Jacobs School of Engineering
Robert Sullivan  
Dean, Rady School of Management

Industry TTAC Members—FY10

The Industry Technology Transfer Advisory Committee (I-TTAC) provides guidance, from an industry perspective, on university technology transfer and strengthens ties with industry partners.

Julia R. Brown  
Member of board of directors: CleanTech San Diego; CONNECT; Labopharm, Inc.; MediQuest Therapeutics, Inc.; and Targacept, Inc.

Bob Slapin  
Executive Director, San Diego Software Industries Council; Member of board of directors: Ecolayers, Inc.

Scott Minick  
President and CEO, BIND Biosciences; Member of board of directors: Chiasma Ltd. and Sorbent Therapeutics, Inc.
Message from the Assistant Vice Chancellor

UC San Diego’s Technology Transfer Office (TTO) continues to make strides in licensing university technology for the benefit of the university community and society. Despite the current protracted recession, TTO was able to partner with companies, large and small, and negotiated 60 license agreements in FY2010. In addition, TTO achieved an all-time high with 75 issued U.S. patents, a 39 percent increase from the previous year when 54 U.S. patents were issued.

University technology transfer programs are garnering more attention. With shrinking budgets and funding shortfalls, there is renewed interest in leveraging university technologies. The TTO works diligently with our academic and industry partners to facilitate the transfer of technology which may produce revenue for the campus.

The TTO received 404 disclosures for inventions and copyrights in FY2010, averaging more than 400 disclosures for each of the last two fiscal years. Thirteen new start-up companies were founded with licensed university technology. The formation of start-ups contributes to the future expansion of the local economic base, by stimulating new job creation and further growth.

In this report, we revisit start-ups from prior fiscal years with updates on their technology and business development activities. Each featured start-up has a different story to tell, reflecting the diversity of the technologies and talent that originate from the university.

At the end of FY2010, we had more than 380 active license agreements with companies from California to China. With 2,600+ available technologies, TTO is open for business, building relationships and facilitating the transfer of innovation into the marketplace.

Sincerely,

Jane C. Moores, Ph.D.
Assistant Vice Chancellor
Technology Transfer
Machine Perception Technologies

What do the following have in common?
• FOX TV’s hit show “Lie to Me,”
• Sony’s “Smile Shutter™” camera feature, and
• the Department of Homeland Security’s efforts to ensure national security at airports.

The answer–Machine Perception Technologies (MPT). Each project is associated with technology invented at UC San Diego and developed by individuals at MPT.

MPT uses proprietary algorithms for the analysis of video in order to build systems that enhance the interaction between people and computer-based machines. The company’s systems detect, identify, and translate human expression into machine-readable form.

MPT was founded in 2009 with licensed technology developed in the Machine Perception Laboratory at UC San Diego. Javier R. Movellan, Ph.D., and his research colleagues are leaders in the field of understanding and quantifying human communication through facial gesture and expression. Their work has provided substantial insight into understanding and replicating computer-based systems that interpret human reaction. As a result, the UCSD investigators (and MPT founders) saw the potential of commercial applications levering a natural, more intuitive interface with people using computer-based technology.

At the time MPT was founded, the video game industry (typically an early adopter of new technology) launched the successful Nintendo® Wii™, which heralded a more natural way to play video games using a hand-held controller. MPT decided to focus on creating visual applications to recognize facial expression and gestures instead of hand-held controllers, and to capitalize on the availability and abundance of video cameras. Additional evidence showed that MPT was on the right path, particularly after the commercial success of the Microsoft® Xbox® Kinect™, which introduced a camera interface that made it easier and simpler for people to interact with complex technologies. The company has also distinguished itself through its advisory board, bringing in thought leaders, such as the preeminent psychologist Paul Ekman, Ph.D., to conceptualize new strategies and product applications for the U.S. Federal Government and leading companies, such as Procter & Gamble and Intel Corporation.

MPT systems are adaptive–capable of learning and recognizing quantified human behavior and expression, unlike biometric systems, which are limited to identifying individuals from a database. This advantage is more attractive as devices become smarter and more autonomous. Human expression is essential to many industries, ranging from marketing and advertising to monitoring and security. MPT is exploiting its strengths by creating adaptive application systems for these industries. The company is developing:
• devices to help marketers better understand their customers,
• learning systems for children to better understand their lessons; and
• security systems to warn of impending security threats.

The company faces many challenges as a start-up, including concerns for privacy, the novel nature of this burgeoning field, and the inherent idiosyncrasies of human expression. Despite these challenges, MPT is paving the road for a simpler, more natural human interface as people interact with and through computer-based machines. MPT is on the leading edge of visual applications in adaptive facial recognition and is well-positioned to advance this technology into the marketplace.

Diagram showing fully automated facial action coding system, using machine-learning techniques.

NOTE: All registered or unregistered trademarks are the sole property of their respective owners.
Genomatica’s Green Vision

Genomatica is an emerging leader in sustainable chemicals, featuring greener intermediate and basic chemicals made from renewable feedstocks, rather than oil and natural gas. The company aims to transform the chemical industry by developing cost-advantaged, smaller carbon footprint products as direct replacements in this trillion-dollar market.

Genomatica was co-founded in 2000 by Dr. Christophe Schilling, at the time an entrepreneurial student working in the research laboratory of Dr. Bernhard Palsson, the Galletti Professor of Bioengineering and Adjunct Professor of Medicine at UC San Diego. Dr. Palsson is a co-founder and remains involved in the start-up as chairman of the company’s scientific advisory board.

In the past decade, under Schilling’s leadership, the company has achieved key milestones—raising venture financing, forging corporate partnerships and relationships, and advancing product development towards commercialization. Currently, Schilling is leading the team to commercialize Genomatica’s first product, a bio-BDO (1,4 butanediol). BDO, an intermediate chemical with a $4 billion market worldwide, is used to manufacture spandex, automotive plastics, running shoes, and more.

The company’s process replaces oil and natural gas with renewable feedstocks such as sugar, biomass, or eventually syngas (a product of municipal solid waste). Instead of competing with the energy and transportation industries to secure the oil and natural gas needed to make chemicals, Genomatica’s sugar-to-BDO process provides a more diversified starting point for production.

Genomatica’s approach has several advantages over the existing business models within their industry. The company’s process outperforms existing chemical processes on cost, flexibility, and environmental impact. Because the process is mechanically simpler than traditional methods, the factories will be simpler and less expensive to build. With 50 percent lower capital expenditures for factories and lower ongoing costs, their potential partners can gain a significant savings over the competition.

In addition, Genomatica’s processes have a lower environmental impact. Their first commercial product, bio-BDO, will have 70 percent lower greenhouse gas emissions. This has a potential savings of 7 billion pounds of carbon dioxide per year, and 60 percent lower energy requirements than competing processes.

Genomatica has also contributed to the greening of the local economy by hiring 70 employees and raising $84 million from investors, which include Alloy Ventures, Bright Capital, Draper Fisher Jurvetson, Mohr Davidow Ventures, TPG Biotech, VantagePoint Venture Partners, and Waste Management. As the company moves towards commercialization and manufacturing, more green jobs are on the horizon—not just locally, but in other parts of the nation and beyond.

The company expects early commercial production in 2012, followed by world-scale manufacturing production in 2013. A testament to their innovation and determination is the recently announced agreements with Waste Management, Tate & Lyle, and M&G (Gruppo Mossi & Ghisolfi). Genomatica’s green approach is poised for further success while transforming the chemical industry.

“I do this to make a difference. Genomatica’s technologies can transform the chemical industry to a more sustainable and profitable future built on renewable feedstocks. This has been my dream since first working together with Professor Bernhard Palsson in the late 90s at UCSD—and the fast-growing team at Genomatica has been relentless in realizing this vision over the past ten years. Our first product, a greener version of the major chemical butanediol, is on a fast path to commercial production in North America, Europe, and Asia, with major global partners.”
SciVee

SciVee is a leading video platform solutions provider for the scientific, technical, and medical (STM) market. The company was founded in 2007 with licensed technology developed by Philip E. Bourne, Ph.D., at UC San Diego.

The company provides a video publishing, distribution, and hosting platform to enliven the online presence of STM content providers. SciVee’s services drive higher traffic, increase viewers, promote authors, and generate new services and monetization options for publishers, professional and technical societies, research groups, and academic institutions.

SciVee products and services are based on five elements:

- Browser-based synchronization technology (patent-pending), where a video and document are synchronized directly on the SciVee site.
- Software as a Service, so the customer does not need to invest in new software or worry about IT administration.
- A DIY (do it yourself) model, such that authors can create and upload videos quickly, easily, and economically with minimal help from editors, publishers, or SciVee.
- Easy integration into current production workflows of publishers and other content providers.
- A public website open for users to access and for researchers to upload videos of interest, and a distribution option for publishers and other content providers.

Please visit www.scivee.tv for more information.

Chimerix

Chimerix is developing novel, antiviral therapeutics with the potential to transform patient care in multiple settings, including transplant, oncology, acute care, and global health. The company was founded in 2002 with technology developed in the laboratory of Dr. Karl Hostetter at UC San Diego.

The company’s lead candidate, CMX001, is in Phase 2 clinical studies in immunocompromised transplant and cancer patients for the treatment of life-threatening viruses, including cytomegalovirus and adenovirus. Over 325 people have received CMX001 to date, including more than 200 patients and healthy volunteers in ongoing placebo-controlled studies, and more than 125 patients under investigator-held Emergency Investigational New Drug applications (EINDs) for the treatment of a wide range of infections caused by dsDNA viruses for which there are either no approved treatments or where available treatment failed the patients.

CMX001 has been well tolerated in all studies, with a growing body of evidence of the compound’s antiviral activity in humans.

To date, CMX001 has been used to treat patients with 12 different dsDNA viral infections across all five families of dsDNA viruses that affect humans. Chimerix is also developing CMX001 as a medical countermeasure in the event of a smallpox release.

Chimerix’s second clinical-stage antiviral compound, CMX157, has completed Phase 1 clinical studies. CMX157 is in development as a potent nucleoside analogue against multidrug-resistant HIV infections.

Led by a world-class antiviral drug development team, Chimerix is also leveraging the company’s extensive chemical library to pursue new treatments for hepatitis C virus, flu, dengue fever, malaria, and other global public health needs.

For additional information on Chimerix, please visit their website at www.chimerix.com.

Ortiva Wireless

Ortiva Wireless was founded in 2004 by Dr. Sujit Dey, based on innovative technologies developed at UC San Diego, where Dey is a professor and heads the Mobile Systems Design and Test Laboratory. Ortiva Wireless offers the industry’s most advanced commercial solutions for proactive management of mobile video, allowing service providers to dramatically improve control, quality, and efficiency of rich media content delivery.

Ortiva’s mVOG (mobile video optimization gateway) for portal services and iVOG (internet video optimization gateway) for open internet media extend service reach, increase network efficiency, and improve video coverage density for mobile operators, while dynamically shaping the content to give subscribers the smoothest video and clearest audio experience possible—regardless of fluctuating and hostile wireless network conditions.

Recently the company raised $8M in its Series C financing. Intel Capital (INTC) led the round with full participation from current investors that include Comcast Interactive Capital, Artiman Ventures, and Mission Ventures. Ortiva will use the funds to expand sales, marketing, and engineering resources in order to meet the growing demands of the business and the market opportunity.

To learn more about how Ortiva is accelerating mobile video delivery, visit www.ortivawireless.com.

NOTE: Ortiva, mVOG, and iVOG are trademarks of Ortiva Wireless, Inc. All other registered or unregistered trademarks are the sole property of their respective owners.
Outreach and Partnering

The Technology Transfer Office organizes and participates in various events throughout the year to promote technology transfer and university research. Listed below are highlights from FY2010.

July 2009
- Tech Trek, American Association of University Women–Science and Math Outreach Program for Middle School Girls
- Career Development Panel–UCSD Department of Reproductive Medicine
- Patents and Patent Searching Workshop–UCSD Staff Education and Development Workshop

September 2009
- Life Science Panel–7th Annual San Diego Venture Summit
- New Technologies Conference–Taipei, Taiwan
- UC System Tech Transfer Advisory Committee–Oakland, CA
- Patents and Patent Searching Workshop–UCSD Staff Education and Development Workshop

October 2009
- TTO Presentation–UCSD Human Research Protections Program Workshop
- University Licensing: Opportunities and Issues–UCSD Department of Bioengineering

November 2009
- Managing IP to Commercialization–UCSD Department of Bioengineering
- Graduate Course on Technology Transfer–UCSD Division of Biological Sciences
- Technology Transfer Workshop–UCSD Entrepreneur Challenge
- 5th Annual SABPA Pacific Forum

December 2009
- Technology Licensing from the TTO and Entrepreneur Viewpoints–San Diego State University, School of Business
- Patents and Patent Searching Workshop–UCSD Staff Education and Development Workshop

February 2010
- Cleantech to Market–UCSD Rady School of Management
- BioSurf Deal Forum
- Innovators Roundtable Meeting–Life Science Technology Presentations

April 2010
- Intellectual Property and Research Notebook Presentation–UCSD Jacobs School of Engineering
- Patents and Patent Searching Workshop–UCSD Staff Education and Development Workshop

May 2010
- Lab to Market: Opportunity & Business Model Analysis–UCSD Rady School of Management
- 2nd Annual Career Conference for Ph.D.’s–UCSD Graduate Student Association, Office of Graduate Studies, and the Career Series Center
- Innovators Roundtable Meeting–Physical Science Technology Presentations
- Intellectual Property and Technology Transfer Panel–American Society for Microbiology Annual Meeting
- San Diego Clean Tech Innovation and Commercialization Program–von Liebig Center

June 2010
- Patents and Patent Searching Workshop–UCSD Staff Education and Development Workshop
- TechConnect Summit World Conference and Expo–Anaheim, CA
- CONNECT FrameWorks Workshop: Public to Private Technology Transfer–Best Practices
- BIO 2010 International Convention–Chicago, IL
Innovation Disclosures (FY2000-2010)

The number of invention and copyright disclosures received during FY2010 was 404, compared to 428 disclosures received during FY2009. For the second year in a row, disclosures totaled over the 400-mark. The distribution between life science and physical science innovations is similar to prior years, with seventy percent life science and thirty percent physical science. This reflects the approximate ratio found in the university’s research focus. The number of active innovations in the San Diego portfolio remained at more than 2,600 at the end of FY2010.

<table>
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<tr>
<th>PATENTS FILED</th>
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<th>FY02</th>
<th>FY03</th>
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<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
<th>FY10</th>
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<td>U.S. Secondary Filings**</td>
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<td>First Foreign Filings***</td>
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<td>41</td>
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<td>60</td>
<td>53</td>
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<td>54</td>
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<td>Total Filed</td>
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<td>267</td>
<td>265</td>
<td>286</td>
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<td>2,712</td>
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<table>
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<th>PATENTS ISSUED</th>
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<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
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<th>FY09</th>
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<td>U.S.</td>
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<td>59</td>
<td>42</td>
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<td>Foreign</td>
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<td>69</td>
<td>79</td>
<td>87</td>
<td>148</td>
<td>62</td>
<td>116</td>
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<td>161</td>
<td>151</td>
<td>114</td>
<td>1,407</td>
</tr>
</tbody>
</table>

*U.S. first filings are typically provisional filings, and some U.S. utility filings.
**U.S. secondary filings are conversions, continuations (includes divisionals, continuations-in-part), and re-filed provisional patents.
***First foreign filings are Patent Cooperation Treaty (PCT) filings.
Note: Foreign National Stage and U.S. National Stage filings are not included in the table above. Some totals may change from year-to-year due to post fiscal year-end adjustments.

Patents (FY2000-2010)

The protection of university intellectual property is critical when companies are licensing technologies and can often be crucial when financing new ventures. In FY2010, 75 U.S. patents issued, a new high for the campus and an increase from 54 issued patents in the prior year. Also during FY2010, 251 U.S. patent applications were filed compared to 225 in the prior year.
Invention Copyright License Agreements for Inventions and Copyrights (FY2000-2010)

Sixty commercial license agreements were finalized during FY2010, compared to 66 agreements in FY2009. The number of invention licenses was 36 for FY2010, and the number of copyright and trademark licenses remained at 24 for the same period.

**Start-ups (FY2000-2010)**

UCSD is at the epicenter of entrepreneurial activity, helping to designate the region as a major biotechnology/high-tech cluster. With a strong base of entrepreneurial faculty, staff, and students, many are motivated to start new companies. In FY2010, 13 new start-ups were founded on technology licensed from UCSD, adding to the growing number of companies that hire UC graduates, stimulate economic development, and attract new venture money into the region. The chart shows the breakdown of start-ups by industry sector.

**Intellectual Property Income (FY2000-2010)**

Intellectual property income includes reimbursements for patent costs, and payments of fees and royalties for inventions, copyrights, and tangible research materials. In addition, FY2010 income includes proceeds of equity sales from previous license agreements. For a breakdown of total income by category, please refer to the appendix.
Mandatory Distributions

The Technology Transfer Office distributed approximately $14.6 million of intellectual property income in FY2010, compared to $15.1 million in FY2009. Distributions were made to inventors/authors, co-owners of IP, participating academic units for research support, the campus fund, and the UC General Fund in accordance with UC policies and UC San Diego campus guidelines. Invention and copyright income distributions are based on income received through the close of the prior fiscal year (FY2009). Material transfer agreement (MTA) income distribution is based on income received in the same fiscal year (FY2010).

<table>
<thead>
<tr>
<th></th>
<th>FY00</th>
<th>FY01</th>
<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
<th>FY10</th>
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<tr>
<td>Innovator Share</td>
<td>$1,598</td>
<td>$2,155</td>
<td>$2,098</td>
<td>$4,054</td>
<td>$2,654</td>
<td>$3,727</td>
<td>$6,192</td>
<td>$8,667</td>
<td>$8,605</td>
<td>$9,553</td>
<td>$9,142</td>
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<tr>
<td>Co-owners Share</td>
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<td>$633</td>
<td>$304</td>
<td>$295</td>
<td>$77</td>
<td>$393</td>
<td>$127</td>
<td>$398</td>
<td>$432</td>
<td>$458</td>
<td>$3,374</td>
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<tr>
<td>Research Labs/HAU/ Dept. Share</td>
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<td>$929</td>
<td>$1,990</td>
<td>$1,271</td>
<td>$1,126</td>
<td>$1,215</td>
<td>$1,747</td>
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<td>UC General Fund Share †</td>
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<td>-$412</td>
<td>$1,519</td>
<td>-$1,219</td>
<td>$1,007</td>
<td>$2,657</td>
<td>$3,382</td>
<td>$2,612</td>
<td>$3,470</td>
<td>$2,569</td>
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<td>$19,059</td>
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<td>Total Distributions</td>
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<td>$5,082</td>
<td>$7,676</td>
<td>$11,714</td>
<td>$13,908</td>
<td>$14,805</td>
<td>$15,070</td>
<td>$14,628</td>
<td>$99,770</td>
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</table>

*Home Academic Unit
†Formerly called State General Fund; FY01 and FY03 shows credit due to extraordinary expenses.
Some totals may change from year to year due to post-closing adjustments.

Global Reach—Licensing by Country (FY2010)

At the end of FY2010, TTO had 388 active license agreements for inventions, copyrights, and trademarks worldwide. The highest concentration of companies and organizations that license university technologies are in the state of California, with a majority of the licensees based in the San Diego region. While we promote local economic development, university technologies also have global reach with licensee companies located in Europe and Asia.

* ASIA: China (4), India (1), Japan (7), Korea (2), Taiwan (1)
* AUSTRALIA: Australia (1)
* EUROPE: Austria (3), Belgium (3), Denmark (3), France (2), Germany (1), Great Britain (10), Ireland (1), Italy (1), Netherlands (4), Switzerland (2)
* MIDDLE EAST: Israel (2)
* NORTH AMERICA: Bermuda (1), United States (338)
* SOUTH AMERICA: Colombia (1)
**Income and Expense**

In FY2010, intellectual property income was approximately $26 million, compared to approximately $27.1 million generated in FY2009. Income included nearly $21 million in invention license fees and royalties; $640,000 from copyright license fees and transfer fees of tangible research materials; approximately $4.4 million in patent cost reimbursement; and nearly $698,000 from the sale of equity acquired from previous license agreements, which was 2.8 times greater than equity income received in FY2009. At the end of FY2010, the university held equity in 56 companies as a result of TTO licensing activities.

The Technology Transfer Office incurred outlays of $10.6 million in FY2010, as compared to $12 million in the previous year. The outlays comprised patent prosecution and copyright costs, UCOP and Innovation Alliances and Services (IAS) assessments, extraordinary expenses, campus operations, and contributions to the UC General Fund. The decrease in FY2010 outlays can be attributed to lower patent prosecution costs ($4.8 million in FY2010 versus $6.3 million from the previous year) and campus operations costs ($2.9 million in FY2010 versus $3.1 million in the previous year). Contributions to the UC General Fund were up slightly, $2.7 million in FY2010 as compared to $2.6 million in the previous year.

### Appendix: Income and Expense (US$ in thousands)

<table>
<thead>
<tr>
<th>INCOME</th>
<th>FY00</th>
<th>FY01</th>
<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
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<th>FY09</th>
<th>FY10</th>
<th>TOTAL</th>
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<tr>
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<td>$7,240</td>
<td>$11,473</td>
<td>$15,496</td>
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<td>$21,236</td>
<td>$20,968</td>
<td>$160,843</td>
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<tr>
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<td>$314</td>
<td>$214</td>
<td>$311</td>
<td>$219</td>
<td>$317</td>
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<tr>
<td>Tangible Research Material</td>
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<tr>
<td>Legal Cost Reimbursement</td>
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<td>$2,899</td>
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<td>$7,261</td>
<td>$4,397</td>
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<tr>
<td>Extraordinary Income*</td>
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<td>$56</td>
<td>$5,552</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05</th>
<th>FY06</th>
<th>FY07</th>
<th>FY08</th>
<th>FY09</th>
<th>FY10</th>
<th>TOTAL</th>
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<tr>
<td>Patent Prosecution</td>
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<td>Campus Operations</td>
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</table>

* Extraordinary income includes non-recurring items such as legal settlements and/or one-time payments.
**Extraordinary expenses includes un-budgeted expenses for litigation and settlement.
***UC General Fund was previously called State General Fund.
†FY10 Assessments were adjusted after year-end closing to $475,000, which will be reflected next year; Innovation Alliances and Services (IAS) was formerly the Office of Technology Transfer (OTT).
Some totals may change from year to year due to post-closing adjustments.