



Innovator Spotlight

Roger Tsien: An Entrepreneurial Nobel Prize Winner

He came from a family of engineers—his father, several uncles and cousins, and a brother. He became absorbed with science and won first place in a national science competition at age 16.



Roger Tsien, PhD

He graduated from Harvard College at age 20. He developed molecules that could track and control the levels of calcium inside cells while attending Cambridge University. He later became a professor of physiology at UC Berkeley.

In 1989, Roger Tsien relocated to San Diego, became a Howard Hughes Medical Institute investigator, and has taught and conducted research at UC San Diego ever since. As a professor of pharmacology, chemistry, and biochemistry, Tsien describes his life’s work as “building molecules to look inside of cells, allowing us to see beyond what the human eye can see.” In 2008 the Royal Swedish Academy of Sciences awarded Tsien the most coveted prize in science, announcing that, “the impact of his groundbreaking success in the development of colorful, glowing dyes and proteins to track cellular behavior has earned him the Nobel Prize.”

Yet there is much more. As an inventor and entrepreneur at UC San Diego, Tsien has made over 40 invention disclosures and is an inventor for 80 issued U.S. and foreign patents. These translate into products that provide a wide variety of valuable research tools for the scientific community. Using Tsien’s technologies, Invitrogen, a division of Life Technologies Corporation, has developed over 100 products, including kits for gene labeling and detection, expression vectors, and live-cell imaging.

General Electric (GE) Corporation has utilized the same green fluorescent-protein technology as Life Technologies. This has enabled GE—and the biotech and pharmaceutical companies that license from them—to develop a variety of products and tools for drug-discovery research.

Clontech Laboratories is another commercial development partner that has created products based on Tsien’s research. The company has launched thirteen expression-vector products based on red fluorescent protein variants. With product names such as: mBanana, mCherry, mOrange, mPlum, mRaspberry, mStrawberry, and mTomato, they are collectively known as Clontech’s Living Colors® Fruit Fluorescent Proteins.

In addition, Tsien’s early research discoveries were crucial to the formation of two startup companies. The first was Aurora Biosciences Corporation, whose focus was high-throughput screening for drug discovery. When investors asked early on if Tsien was willing to be CEO, he declined, stating it was not “within my talents,” but he continued as lead scientific advisor. Clearly, Tsien knew how to best utilize his talent. Aurora went public in 1997, was included in the Russell 5000 (the next tier down from the Fortune 500), and in 2001 was acquired by Vertex Pharmaceuticals for more than \$500 million.



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Dr. Roger Tsien's lab created this wreath as an entry in a Christmas wreath contest for a pharmacology holiday party. Tubes of various fluorescent proteins were displayed in a box with UV light shining on them.

U.S. Patents Issued

Researchers at UC San Diego have received over 50 U.S. patents each year since 2000. In the first three quarters of the current fiscal year, nearly 40 patents have issued. The issued patents below are grouped by school or division.

Division of Arts and Humanities

Jaime A. Pineda, Brendan Z. Allison
7,460,903, Method and system for a real time adaptive system for effecting changes in cognitive-emotive profiles

Division of Biological Sciences

Ethan Bier, Kweon Yu
7,402,566, Peptide inhibitor of TGF- β . growth factors

Charles S. Zuker, Nicholas J.P. Ryba, Gregory A. Nelson, Mark A. Hoon, Jayaram Chandrashekar, Yifeng Zhang
7,402,400, Mammalian sweet taste receptors

Charles S. Zuker, Angela L. Huang
7,407,769, Method of identifying activity modulators of a polycystin-2L1 taste receptor polypeptide

Charles S. Zuker, Jon Elliot Adler, Mark Hoon, Nicholas J.P. Ryba, Ken Mueller
7,452,694, Nucleic acids encoding T2R of taste receptors

Charles S. Zuker, Isolde Erlenbach, Nicholas J.P. Ryba, Grace Zhao
7,459,277, Mammalian T1R3 sweet taste receptors

Charles S. Zuker, Jon Elliot Adler, Nicholas J.P. Ryba, Ken Mueller, Mark Hoon
7,465,550, Method for screening taste-modulating compounds
7,479,373, Method for identifying compounds modulating taste transduction

Charles S. Zuker, Nicholas J.P. Ryba, Gregory A. Nelson, Mark A. Hoon, Jayaram Chandrashekar, Yifeng Zhang
7,507,793, Mammalian sweet taste receptors t1r3

Division of Physical Sciences

Michael J. Sailor, Jun Gao, Sangeeta Bhatia, Christopher Flaim
7,433,811, Direct patterning of silicon by photoelectrochemical etching

Michael J. Sailor, William C. Trogler, Honglae Sohn, Rebecca M. Calhoun
7,482,168, Photoluminescent polymetalloles as chemical sensors

Susan S. Taylor, Andreas Braun, Charles R. Cantor, Stefan M. Kammerer, Lora Burns-Hamuro, Charles Cook, Gary Olson, Christopher Self
7,432,342, Kinase anchor protein muteins, peptides thereof and related documents

Jacobs School of Engineering

Anthony Acampora, Joseph Soma Reddy
7,486,641, Mobility management in wireless Internet protocol networks

Nathan J. Delson
7,503,410, Dynamic legged robot

Sadik C. Esener, Mark Wang
7,439,009, Three-dimensional optical data storage in fluorescent dye-doped photopolymer

Yu-Hwa Lo
7,453,646, Fluidic adaptive lens systems and methods

Robert L. Sah, Kelvin W. Li, Travis J. Klein, Barbara L. Schumacher, Koichi Masuda, Eugene J-M. A. Thonar
7,476,257, Methods to engineer stratified cartilage tissue

Christophe H. Schilling
7,440,855, Identification of antibiotic targets and critical points in metabolic networks based on pathway analysis

Paul H. Siegel, Mats Oberg
7,484,168, Parity check outer code and run-length constrained outer code usable with parity bits

Bang-Sup Song
7,453,291, Switch linearized track and hold circuit for switch linearization

School of Medicine

Kenneth R. Chien, Masahiko Hoshijima, John Ross, Jr., Yasuhiro Ikeda
7,399,750, Methods for cardiac gene transfer

Michael Karin, Pankaj Kapahi
7,399,606, Methods for identifying I κ B Kinase (IKK) inhibitors

Michael Karin, Masahiko Hibi, Anning Lin
7,468,426, Oncoprotein protein kinase antibody kit

Michael Karin, Uwe Senftleben, Yixue Cao
7,491,506, Inhibition of B-cell maturation and antibody production

Thomas J. Kipps, Charles E. Prussak, Mark J. Cantwell
7,495,090, Nucleic acids encoding chimeric CD154 polypeptides

Eliezer Masliah, Edward Rockenstein, Margaret E. Mallory
7,393,994, Transgenic mouse model for neurodegenerative diseases

C. Lowell Parsons
7,414,039, Interstitial therapy for immediate symptom relief and chronic therapy in interstitial cystitis

Eyal Raz, Daniel Rachmilewitz
7,485,627, Method for treating inflammatory bowel disease and other forms of gastrointestinal inflammation

Roger Y. Tsien, Lei Wang
7,393,923, Red-shifted fluorescent proteins mPlum and mRaspberry and polynucleotides encoding the same

Roger Y. Tsien, Jianghong Rao
7,396,926, Beta-lactamase substrates having phenolic ethers
7,427,680, Fluorogenic substrates for BETA-lactamase gene expression

Roger Y. Tsien, Tao Jiang
7,431,915, Peptides whose uptake by cells is controllable

Scripps Institution of Oceanography

Steven C. Constable, Kerry W. Key
7,482,813, Three-axis marine electric field sensor for seafloor electrical resistivity measurement

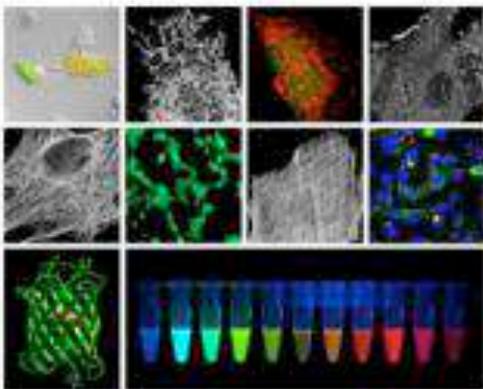
Tsien (continued from page page 1)

Tsien was also involved in a second startup—Senomyx, Incorporated—a company that uses taste-receptor technology to improve food and beverage nutrition while maintaining (or enhancing) taste. Tsien co-founded this company with his UC San Diego colleague, Charles Zuker. Both currently serve as members of Senomyx’s scientific advisory board, providing guidance on research and development activities and serving as scientific and technical advisors.

Tsien is a man who wears many hats. He’s professor and mentor to many former and current undergraduate and graduate students and post-doctoral researchers. He’s a corporate advisor. He’s a researcher and inventor. Some of his current projects revolve around new technologies that use dyes and drugs to specifically target cancer cells, thus surgeons can remove tumors more accurately and eradicate any leftover (malignant) cells.

At age 57, Roger Tsien has already accomplished a great deal.

While he and his colleagues proudly accept their Nobel recognition, their interest and commitment to science doesn’t stop there. One has to wonder, “What will he invent next?”



Composite image of various fluorescent proteins.

Two UC San Diego Startups Acquired

CarCode Corporation, a UCSD start-up company was acquired by Transport Data Systems, Inc. CarCode was founded with technology developed by professor Serge Belongie, CSE, Video-based Car Surveillance: License Plate, Make, and Model Recognition. Financial terms were not disclosed.

Blaze DFM, Inc., founded with technology developed by Professor Andrew Kahng, CSE/ECE, was recently acquired by Tela Innovations. Blaze DFM was founded in 2004 to develop and deliver electrical DFM solutions for integrated device manufacturers (IDMs), fabless semiconductor companies, and silicon foundries.

Tela Innovations is a privately-held company based in Campbell, California that provides solutions addressing the challenge of scaling semiconductor design and manufacturing to advanced process nodes. Financial terms were not disclosed. ([Tela press release](#))

Start-up Financing Update

Traversa Secures \$5 Million in Series B

Traversa Therapeutics Inc., secured \$5 million in series B funding in early April. The investment was led by Morningside Venture Investments, which was joined by Mesa Verde Venture Partners and existing investors. The company plans to initiate a series of non-human primate studies designed to further validate its delivery approach for its oncology program.

The delivery technology, called [PTD-DRBD](#), comprises protein transduction domains linked with a double-stranded RNA binding domain and was developed by

Professor Steven Dowdy, CMM/ Medicine and Howard Hughes Medical Institute Investigator. ([Traversa press release](#))

Sangart Raises \$50 Million For Blood Substitute

San Diego-based Sangart, a biopharmaceutical company developing artificial blood products based on human hemoglobin, says it has raised \$50 million in funding that completes its Series F round.

Sangart says the \$50 million was raised when its investors exercised warrants the company had issued in 2007 as part of its Series F round, and bring total funding collected in that round to about \$100 million. The company plans to use the proceeds to fund continued clinical development of its products, which are based on a molecule Sangart calls MP4.

MP4 is an oxygen-carrying molecule that Sangart makes by chemically modifying human hemoglobin purified from outdated donated blood. Late-stage clinical trials of MP4 in orthopedic surgery patients completed last year didn’t show the oxygen carrier improved clinical outcomes for those patients, so the company is pursuing other indications for the molecule under guidance from its scientific advisory board.

Sangart was founded in 1998 to commercialize research conducted at the Letterman Army Institute of Research and UC San Diego. Its founder was UC San Diego’s Professor Robert M. Winslow, who served as Sangart’s president, chief executive officer, and chief medical officer until June 2008. After ten years of vigorous work and dedication, Winslow stepped down as Sangart’s chairman in December 2008 due to the diagnosis of brain cancer. Sadly, Winslow lost his battle against cancer and passed away two months later on February 2, 2008. (*Excerpted from www.xconomy.com*)



David Gibbons, MBA, PE

TTO @ Work

David Gibbons, Assistant Director-Physical Science Licensing organized a professional panel on patent decisions during the Association of University Technology Managers (AUTM) Annual Conference held February in Orlando, Florida. David's panel session and comments were published in the March issue of Technology Transfer Tactics along with several intellectual-property related topics.

New Licensing Staff @ TTO

Victoria Cajipe, Senior Licensing Officer, joined the TTO Engineering licensing team last fall. She

received her PhD in physics from the University of Pennsylvania and post-doctoral studies Centre National de la Recherche Scientifique (CNRS) in France. Victoria worked at the Institut des Matériaux Jean Rouxel, focusing on advanced materials and the use of x-ray/neutron scattering and related techniques to characterize structures, physical properties and phase transitions in various condensed matter systems. She was also involved in studies of optical force methods for seeding protein crystal growth. Victoria's business experience includes executive, research, business development and customer relations responsibilities. She has published over 60 scientific articles, participated regularly in conferences on materials science and



Victoria Cajipe, PhD

radiation detection, and established a track record of successful grant applications and profitable small-business operations.



Wendy Shih, PhD

Wendy Shih assumed the responsibility of Licensing Officer last winter to manage a portfolio of bioengineering innovations. She received her PhD from UC San Diego in immunology/genetics and completed fellowship training in the Clinical Immunology Laboratory Director Training Program at UC Los Angeles Medical Center. Wendy has extensive work experience in the biotech industry in technology licensing, research and product development management, facilitation and adaptation of technology transferred from academia, innovation scouting, and alliance formation between industries and industry-academia. After completion of her fellowship at UCLA, Wendy lead the R&D team in charge of all immunology based and related diagnostic tests for BioScience

Laboratories now Quest Diagnostics. After returning to her beloved San Diego, she worked at Hybritech, Ligand, and BRI with increasing R&D management and business development responsibilities in clinical diagnostics and devices, monoclonal antibody technology, molecular biology tests, high-throughput drug screening assays, and genetic testing. In addition, Wendy also worked in tobacco cessation counseling.

Events and Outreach

For additional information about the events listed below, please send email to invent@ucsd.edu.

- 4/27/09: Material Transfer Agreements Workshop @ Calit2
- 5/1/09: [California Clean Innovation Conference 2009](#) - UC San Diego
- 5/18-21/09: [Bio2009 Annual Convention](#) - Atlanta, Georgia
- 5/20/09: Biennial Salute to Innovations - An academia/industry event to recognize researchers with licensed technologies and our corporate partners who have licensed university technologies. By invitation only.



TTO Innovators Roundtable Meeting

Sign Up for inventInsider – Monthly Technology Updates

TTO is launching a new service, a monthly email that lists the latest technologies developed at the university. If you are interested in receiving an email on what is new and available from UC San Diego, sign up to get inventInsider. Send your name and email address to invent@ucsd.edu and put inventInsider in the subject line.

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