

# Inventor of the Year Award Recipients 2004 - 2011

## 2011 – David Baker, PhD



**David Baker, PhD.**, is an Investigator of the Howard Hughes Medical Institute (HHMI) and Professor of Biochemistry with adjunct appointments in Genome Sciences, Bioengineering, Computer Science, Chemical Engineering, and Physics. Dr. Baker graduated from Harvard University in 1984, completed his PhD in Biochemistry at University of California (Berkeley) in 1989, and then began working on protein structure as a postdoctoral fellow in Biophysics at University of California (San Francisco). Dr. Baker is now regarded as a world-leading expert in computational protein structure prediction and design.

Dr. Baker has made fundamental progress in predicting and designing new macromolecular structures, interactions, and functions. His Rosetta computational suite can predict protein structures from DNA sequence, and design new proteins of almost any shape or activity. This giant step forward enables the full potential of the human genome sequence to be realized in drug design, gene therapy, vaccines, and personalized medicine; and it opens the door to designing new proteins capable of green chemistry, bioremediation, and biofuel transformations. Baker has also developed exciting new modalities for engaging the general public in scientific research including Rosetta@home (<http://boinc.bakerlab.org/rosetta>) and FoldIt, a multiplayer online game for predicting protein structures (<http://fold.it>).

Building on his expertise, Dr. Baker founded Bio Architecture Lab, a pioneer in the use of synthetic biology and computational enzyme design. Their goal is to develop novel specialty chemicals produced from renewable carbon sources in order to produce the world's lowest cost, most scalable, and sustainable source of sugars for biofuel and renewable chemical production. He also co-founded Arzeda, whose biochemical products aim to replace petroleum-based products. In December of 2010 Arzeda and DuPont business Pioneer Hi-Bred reached the first milestone in a technology collaboration to develop new traits to increase agriculture productivity. Their work was featured in a Microsoft Case Study to showcase its innovative use of cloud computing for solving challenging computational problem.

## 2010 – Roy Martin, PhD



**Roy Martin, PhD**, was a Research Professor at the University of Washington in the Departments of Anesthesiology and Bioengineering with a joint appointment in the Applied Physics Laboratory. He retired in 2004. Dr. Martin earned his B.S.E.E. from Montana State University, an M.S.E.E. from University of Southern California and his Ph.D. from the University of Washington. He holds over 25 issued U.S. patents.

Dr. Martin has been an innovator for his entire academic career. He has used his engineering background to design new devices for the diagnosis and treatment of a variety of medical and dental conditions. His approach is to study a problem and then find a solution using

technology. This has resulted in a variety of new devices, several of which have changed and improved healthcare. His initial effort was a new method to diagnose cardiac output. He then developed a method for detecting air emboli during neurosurgery. Using ultrasound, he developed a probe which could be passed through an endoscope channel to detect blood flow prior to making an incision and to examine the GI wall structures for diagnosis. He developed a device for studying esophageal motility from the inside of the esophageal lumen. He worked on 3D ultrasound cardiac imaging and performed some of the pioneering studies in this important field which have led to improved quantitative cardiac imaging to study myocardial contractility and cardiac output. He also worked on focused high intensity ultrasound to detect and treat bleeding from injuries such as abdominal trauma. In addition, he was one of the inventors of the Sonicare toothbrush, a very successful device used by millions to improve their dental hygiene. Dr. Martin is an outstanding innovator who dedicated his career to improving healthcare using new devices.

## 2009 – Bruce Montgomery, MD, Bonnie Ramsey, MD & Arnold Smith, MD



Bruce Montgomery, MD, is Gilead Sciences' Senior VP, Head of Respiratory Therapeutics. Dr. Montgomery founded Corus Pharma and worked for PathoGenesis. He has devoted his career to development of cystic fibrosis drugs and moving them through the commercialization process. He earned his MD at the University of Washington.

Bonnie W. Ramsey, MD, is a UW Medicine Professor of Pediatrics with a pulmonary specialty and Director of the Research Center for Clinical and Translational Research at Seattle Children's where she works in the Cystic Fibrosis Clinic. She is a beloved physician and internationally respected researcher. She earned her MD at Harvard.

Arnold (Arnie) L. Smith, MD, is a UW Professor of Pediatrics, Director of the Center for Childhood Infections and Prematurity Research at Seattle Children's. Currently his ground breaking research focuses on the gene expressions of the numerous bacterium responsible for mucosal diseases. He earned his MD from the University of Missouri.

The original idea for aerosolized tobramycin (TOBI), a drug for cystic fibrosis) came from the work of Drs. Smith and Ramsey, who also credit their entire research team at Seattle Children's. Tobramycin had been used to treat *Pseudomonas aeruginosa*, an often fatal respiratory infection in patients with cystic fibrosis. However, use of the drug often resulted in severe kidney damage. To avoid the side effects to the kidneys, Dr. Smith created and refined an inhaled aerosol version of TOBI. This work was carried through early proof-of-concept work in clinical trials by Dr. Ramsey. Her work, with its national scope, revolutionized the clinical trials process and led to the development of new infrastructures and trials standards.

Dr. Montgomery brought his medical expertise in pulmonology and his keen business sense to bear in moving TOBI through the difficult phase of patent approval, as well as through the development and refinement of the concept into a product with commercial potential. Funds from the eventual sale of the TOBI royalties have enabled construction of new research laboratories for Seattle Children's and attracted increases in NIH research. Cystic Fibrosis Foundation royalty sale proceeds have returned to Seattle Children's to fund therapeutics and clinical trials network development.

The Seattle Children's partnership with PathoGenesis has had many direct and indirect economic impacts on the region's employment, real estate development, financial and legal sectors. The sale of PathoGenesis, and the subsequent sale of Corus Pharma, brought large amounts of capital to the region. Current annual income from TOBI is approximately \$300M, some of which is being used to develop new CF drugs. As an added patient and social benefit, TOBI has proven to be very cost effective by decreasing hospitalizations. Most importantly, thousands of children and young adults are alive because of this drug that was born and raised in the State of Washington. US patent # 5,508269 is the result of a model university-business community collaboration and illustrates the health and economic values that come from these relationships.

## 2008 – Irwin D. Bernstein, MD



**Irwin (Irv) D. Bernstein, M.D.**, is Chief of the Division of Hematology/Oncology and Bone Marrow Transplantation at Seattle Children's Hospital & Regional Medical Center; Professor of Pediatrics and Director of the Division of Pediatric Hematology/Oncology at the University of Washington; and Head of the Pediatric Oncology Program at the Fred Hutchinson Cancer Research Center. Dr. Bernstein earned his M.D. from New York University and joined the FHCRC in 1971.

Irwin Bernstein, as a young physician in the 1960s, became committed to the treatment of children with leukemia, a disease that was an almost certain killer of his small patients. In his drive to improve the survival rate he has spent 40 years seeking a cure for leukemia.

Dr. Bernstein is being honored for his discovery of a protein, CD33, found on the surface of most acute myeloid leukemia cells. Working with the biomedical industry he translated this discovery into the development of Mylotarg, a drug widely used for treating acute myeloid leukemia and the first FDA approved antibody-targeted chemotherapeutic agent. Mylotarg is based on a proprietary "linker" technology that combined a potent anti-tumor antibiotic with an antibody that binds to CD33 protein on a cancer cell. Healthy cells are spared as the agent is delivered directly to the cancer cell. His current NIH sponsored studies of hematopoietic stem cells have led to a novel approach for expanding stem cell numbers in cord blood. This methodology is being tested in a clinical trial to improve cord blood transplantation.

## 2007 - Philip P. Green III, PhD



Philip P. Green III, PhD's work has had a profound impact on the development and success of genome analysis. His software has made the sequencing of the three billion pairs in the human genome possible and represents the most important technical advance in DNA sequencing of the 1990s.

Dr. Green's remarkable suite of integrated software products – Phred, Phrap and Consed-Autofinish - are tools used throughout industry and academia. The programs were some of the first and are still among the most important licensed through UW Tech Transfer. Licenses have been purchased by over 250 commercial sites and are furnished at no cost to thousands of academic laboratories. Proceeds from license activities are reinvested in his laboratory and used to support graduate students who are pursuing interdisciplinary training in the design and use of computational methods. Dr. Green's goal is "to help provide the computational methods necessary to achieve a complete, quantitative understanding of how cells function at the molecular level".

Dr. Green is a Professor of Genome Sciences, Adjunct Professor of Computer Science and Engineering and a Howard Hughes Medical Institute Investigator. He has been elected to the National Academy of Sciences and the AAAS and has been honored with a prestigious Gairdner Foundation Award. He is a graduate of Harvard and UC Berkeley and joined the UW faculty in 1994 following work at Princeton, the University of North Carolina, and Washington University.

## 2006 - David C. Auth, PhD



David C. Auth, PhD 's work at the UW's Departments of Electrical Engineering and Bioengineering focused on improving medical care using least-invasive surgery techniques. His early work, along with clinicians from the UW School of Medicine, improved the understanding of upper gastrointestinal bleeding and how it could be controlled endoscopically. This NIH funded research resulted in methods to control bleeding using lasers and direct application of heat.

In 1981 he developed the technology for the Rotoblator system for cleaning out arterial plaque. The Rotoblator uses a diamond encrusted, football-shaped burr on the end of a catheter that, rotating at very high speeds, removes brittle plaque while leaving normal tissue intact. Dr. Auth founded Heart Technologies, which received clearance to market Rotoblator for peripheral (leg) arteries in 1991 and for coronary arteries in 1993. By 1995 Heart Technologies had grown to 500 employees with revenues in excess of \$80 million per year. It was sold to Boston Scientific Corporation in 1995.

The Rotoblator technology is among Dr. Auth's 100 patents in the field of medical devices. He currently serves as a director for four medical device companies and is active as an inventor, developer, and consultant in the medical device industry.

## 2005 – Earl W. Davie, PhD



**Earl W. Davie, PhD**, Professor and former Chair of the School of Medicine's Department of Biochemistry, was honored as the second annual Inventor of the Year for proposing and substantiating the complex chain of biochemical events that result in fibrin clotting, the central process of blood coagulation.

During his long research career he has cloned and sequenced many genes that code for proteins involved in blood coagulation. This work led directly to the development of safer clotting factors that hemophiliacs can self-administer to control their bleeding, a development that has vastly improved the management of the disease.

In the early 1980s Dr. Davie, with his colleague Kotoku Kurachi, PhD, cloned the gene for factor IX, a blood clotting protein. The technology was patented and later licensed for manufacture. In 1997 the FDA approved a pharmaceutical product for patients with hemophilia B.

In 1981 Dr. Davie co-founded Seattle-based ZymoGenetics which focuses on the discovery and development of protein therapeutics.

## 2004 – Benjamin Hall



**Benjamin Hall**, PhD, UW geneticist, was the first recipient of the UW Innovator of the Year Award. Dr. Hall is a legend in the field of genetics. He invented a new drug treatment, produced in Snohomish County, that both improved healthcare and the local economy. In 1981, Dr. Hall and his colleagues invented a method for turning yeast cells into tiny biochemical factories, churning out proteins vital in the development of drugs. This manufacturing method is so successful that it is now used to make more than 1% of all drugs sold in the U.S.

The method has been licensed to several companies, including Seattle's Immunex (now Amgen), which used the method to create the drug Leukine. Leukine is a growth factor that replenishes the body's immune cells, thereby helping patients undergoing chemotherapy or bone marrow transplants. Years later, another biotech company, Berlex, bought the patent to the drug. Then, Berlex announced it would build a biotech plant in Snohomish County to produce Leukine. The move would provide about 70 new jobs and millions of dollars of investment in the local economy.

Dr. Hall's invention also led to the production of a hepatitis B vaccine and other biopharmaceuticals. Since the FDA approved the vaccine in 1986, new infections in the U.S. have dropped from about 250,000 per year to about 60,000. Millions of lives around the world have been saved through the prevention of new infections. Pharmaceutical companies are also using these discoveries to manufacture a new vaccine for human papilloma virus and insulin. Over 1 billion hepatitis vaccinations have been administered.