



HARVARD

SCHOOL OF DENTAL MEDICINE

OFFICE OF RESEARCH BULLETIN

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The Laboratory for Innovative Translational Technologies (LITT)

at Harvard School of Dental Medicine (HSDM) was established July 2007 to enable researchers to bridge the "innovation gap" between academia and industry. The primary mission of LITT is to enable HSDM researchers and the Harvard research community early access to new, enabling leading-edge genomic and proteomic technologies. LITT functions in a collaborative mode of research that is essential for the translation of new technologies into practical biomedical applications. A part of LITT's mission is to stimulate translational research collaborations within HSDM and HMS communities. In addition, it will help researchers to reach their endpoint quicker, with less risk at a reduced cost. LITT currently has local, national and international collaborations in a wide variety of research areas, including bio-defense, biomarker detection in cancers, craniofacial development, emerging infectious disease and orthopedics. In one such area, bio-defense, LITT is a member of the Advanced Medical Counter Measures Consortium, a Department of Defense (DOD) funded research collaboration.

The commercial collaborative firms (CCFs) who enter into a collaborative agreement with LITT benefit greatly, in the form of access to high profile research projects and a comprehensive evaluation of their technologies against current "gold standards" and/or similar technologies. In this collaborative model, an open channel of communication is maintained between LITT, the researchers and respective companies with respect to continuous feedback, evaluation, potential publications and intellectual property. LITT and CCFs will co-sponsor seminar/workshop series that will entail data presentation by the researcher and a technical/application presentation by the CCF. LITT works with CCFs who are seeking to commercialize their new ideas and are interested in gaining an edge in the global markets.

LITT is also aware that many researchers are very focused in their research, thus making them unaware of nascent technologies that emerge from industry or academics. LITT is committed to breakdown these barriers and to increase the awareness of these novel technologies among local researchers. This collaborative mode can potentially accelerate the research process by generating high-quality data. LITT currently host technologies ranging from sample preparation (Pressure Bioscience's Barocycler NEP2320) to measuring kinase activity (PamGene's PamStation). Other technologies at LITT include BioMicro's hybridization system, BioTrove's OpenArray system, Exiqon microRNA arrays, Febit's Geniom, Fluidigm's BioMark System, Phalanx Biotech microarrays and the Roche 480 LightCycler. We are currently in the process of placing other technologies from High Throughput-Genomics, ICX Nomadics, Zeptosens and Roche Applied Sciences, to name a few. We are currently involved with early access evaluation projects with companies such as Dharmacon, Exiqon, Luminex, and NanoString. As one can envision, this environment creates new venues for brainstorming about novel approaches to tackle or expand current research projects, "thinking outside the box" approach.

In addition, another role of LITT is to help the researchers "make sense of all the data" in separating signal from noise and to build interest and trust in the use of new quantitative tools for the diagnosis and prognosis of disease or biological processes in question, but also be involved in the study design to maximize each data point generated. We are in the process of developing a Bioinformatics Resource Center" in conjunction with Decision System's Group, Brigham and Women's Hospital that will be accessible through LITT. At present LITT has extensive experience with DNA and microRNA technologies from different commercial vendors as well as a number of alternative technologies for gene expression measurements (i.e. SAGE, MPSS, SBS and QRT-PCR). LITT is currently starting to process protein and protein kinase data and hopes to explore new technologies for high-throughput sequencing (NexGen Sequencing Technologies). LITT is always ready and willing to evaluate new technologies requested by researchers and vendors.

LITT also attempts to provide a great networking environment between Harvard researchers and companies, between researchers and between companies, a "win-win" environment.

MESSAGE FROM THE DIRECTOR

I would like to welcome everyone to LITT. LITT plays a vital intermediary role between that of a core facility and a program in biomedical and clinical research by providing early access to cutting-edge technologies to researchers in the Harvard community. We want to create a "win-win" environment between researchers and industry. I feel that during tough funding times another alternative to obtain a competitive edge is to generate high quality data in a collaborative mode with industry. Industry benefits by getting exposure to key research laboratories and researchers within the Harvard Community, experimental results and data generated on real world samples, input on competitive technologies, competitive comparisons, experimental design assistance and feedback on the performance of their technology. If researchers and vendors are interested or have questions about LITT' collaborative model, please do not hesitate to contact me. Since this

is a very new initiative, any comments or suggestions to improve our model is also greatly appreciated.



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PUBLICATIONS

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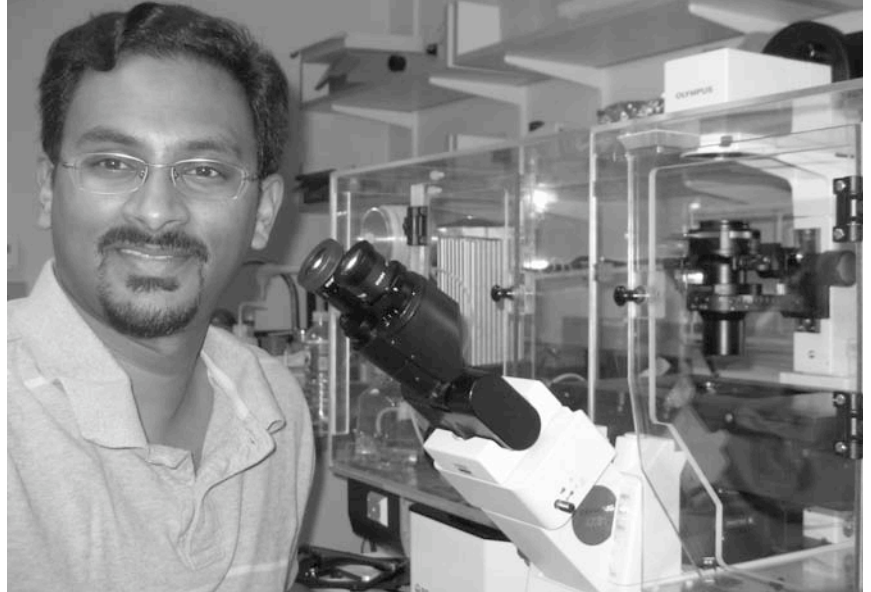
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PRAVEEN ARANY: S P A N N I N G S C I E N C E S

Praveen Arany arrived in Cambridge from his home in Bangalore, India, one year ago to embark on a unique program in the life sciences – one made possible only by the flexibility of Harvard's graduate programs.

He took a basic degree in dental surgery and earned a masters degree in oral and maxillofacial pathology in India. After that, he had additional training at the Indian Institute of Science and the National Cancer Institute, part of the National Institutes of Health. Now at Harvard, Praveen is enrolled in three programs: the PhD program in Biological Sciences in Dental Medicine, the Leder Medical Sciences Program and a residency training program in Oral and Maxillofacial Pathology all focused on providing formal training in biological sciences for HILS students.



Says Praveen: "I believe I am doing a unique probably the first of its kind in Harvard program." He credits Bjorn Olsen, professor of developmental biology and of cell biology, and Connie Cepko, professor of genetics, with being instrumental in helping to pull together his academic program.

He was drawn to the Graduate School's program in dental medicine for its flexibility – Praveen's interdisciplinary "Residency-PhD" combined program is certainly an original pathway to medicine. He also appreciated the quality of its faculty, many of whom are pioneers in their fields and have written textbooks that have become standards in the field. "To interact with researchers who write these very texts and essentially set the bar is a truly humbling and exciting experience," he says.

Interdisciplinary clinical research training has been the highlight of Praveen's graduate career. "What attracted me most to the basic sciences was the ability to get definitive answers, but I learned quickly they too (like medicine) had many limitations," he says. His present situation draws from "the best in both worlds," he says. "Only in a place like Harvard is such an interdisciplinary program logistically feasible, where there seems to be truly no limits to resources or possibilities." Praveen works most closely with two scientists: David Mooney, the Gordon McKay professor of bioengineering, and his clinical mentor, Sook-Bin Woo, an assistant professor in the School of Dental Medicine's Department of Oral Medicine, Infection and Immunity and at Boston's prestigious Brigham and Women's Hospital.

Professor Mooney's lab addresses a range of projects that attempt to bioengineer stem cells for use in regenerative medicine. "My basic research focus in the Mooney lab is to understand how a cell 'perceives' and 'interprets' external cues," says Praveen. "My major aim is to analyze this 'interface' and the signaling pathways initiated in embryonic development and malignancies," he says. His hope is to initiate research projects to study these phenomena in a clinical setting.

As for his more distant professional future, Praveen hopes to lead a clinical lab to pursue translational research with a focus on biological mechanisms. "I read someplace [that] scientists are basically little girls and boys with toys," he says. "To figure out how things work is pretty much a basic instinct – until we get 'educated' and are 'told so.' But the real scientists seem to always keep this fascination alive."

RESEARCH NOTABLES



Congratulations to Samuel Koo, DDS, MS, Instructor in Restorative Dentistry and Biomaterials Sciences for his recent award from the ITI Foundation entitled, “Molecular analysis of early bone healing around titanium implants, an in vivo studies in rats.”

A detailed insight into the early in vivo osseointegration healing response is lacking. This investigation will describe the molecular of early bone-healing response to titanium implants in vivo by assessing the osteoblastic-related gene expression.

Research at HSDM has come a long way since the completion of the Research Strategic Plan in 2000

- funding is up, the number of publications in top journals has increased and the infrastructure of research training and faculty research has been strengthened. The School has developed a strong reputation for excellence in skeletal development, growth and homeostasis. With the arrival of Roland Baron to lead Oral Medicine, Infection and Immunity, we are positioned to further expand HSDM's impact in applying science to improve health.

Concurrently, exciting opportunities are on the horizon within the University and the School of Medicine for translational and clinical research that can advance our basic strengths and showcase the Dental Center as Harvard's only patient-care health facility. Opportunities are also emerging that may strengthen our program through additional recruitments, as well as local, national and international collaborative efforts.

Therefore, now is the time to plan our research strategies for the next five years. This Committee is charged to assess the status of our research, define the major craniofacial and dental medicine clinical problems and prioritize those deserving our most intense research efforts to enable the greatest impact on global health. Now is the time to determine how we can best take advantage of our unique opportunities and build on our strengths. Now is the time to make the greatest contribution to fundamental knowledge, solve clinical problems to the benefit of patients and create the research-intensive intellectual environment that best stimulates our students - the future leaders. Clearly, now is the time to plan a translational and clinical research effort that is the model, restate our commitment to serving humankind and define the strategies required for turning our vision—to set the standard of excellence in dental education, practice and research to develop and foster a community of global leaders advancing oral and systemic health—into reality.

Toward that end, Dr. Bjorn Olsen, Dean for Research, has agreed to serve as the Research Strategic Planning Committee Chair. His passion and commitment to the School in its research enterprise remain unparalleled and ripe with future possibilities.

Members of the Research Strategic Planning Committee include: Dr. Bjorn R. Olsen, Chair, Dr. Roland Baron, Ms. Mary Cassesso, Ms. Dawn DeCosta, Dr. Thomas Dodson, Dr. Howard Howell, Dr. Elsbeth Kalenderian, Dr. Beate Lanske, Dr. Chin-Yu Lin, Mr. Jim McBride, Dr. Vicki Rosen, Dr. Robert White, and Dr. Malcolm Whitman.

QUESTIONS . COMMENTS . SUGGESTIONS .

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