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## **BIOGRAPHICAL SKETCH**

I began my education in organic chemistry, going on to earn an M.S. in environmental and sanitary engineering in 1984. I came to IIT to pursue my Ph.D. in environmental engineering, which I completed in 1992. In that same year I began teaching and conducting research in what was then the Pritzker department of environmental engineering as visiting assistant professor. I started my tenure track position as an assistant professor of chemical and environmental engineering in 1995.

My three year post Ph.D. academic experience made me realize that an environmental education focused only on scientific solutions to environmental problems and was insufficient to meeting the needs of the industry. In order to develop workable solutions, we must take into account the constraints and opportunities brought on by politics, business, the legal/regulatory system, and the economy. In turn, this shifted my academic focus towards directing the development of innovative and cost effective processes for managing waste generated from a wide range of economic development activities including industrial operations, logistics and supply chains. This type of research requires not only a rigorous analysis of the costs associated with production processes and the utilization of their developing systems, but it also necessitates a good understanding of the steps involved in the commercialization and marketing of the products. I also began to believe that in the environmental field there was a growing need to educate engineers and scientists about business and business people about the science.

In 1995, because of my qualifications in multiple areas of science and my strong interest in looking beyond engineering and science alone to solve environmental problems, I was chosen to participate in the development of the Environmental Management (EM) program at IIT. Working closely with Dean of IIT Stuart School of Business, I became actively involved in the start-up of the program. My responsibilities included reviewing and developing EM curricula, developing and teaching courses at the business school, selecting proper faculty to teach programs' customized courses, advising students and marketing the program through a variety of professional seminars.

Between 1995 and 2002, I have accordingly served as both assistant professor of environmental engineering in the department of chemical and environmental engineering and director of the technical courses at Stuart's (EM) program. During this period, I was an active member of the IIT community, successfully carrying out a wide range of responsibilities that included: developing and teaching about 20 courses in both the environmental and chemical engineering, and environmental management programs; generating research and educational grants and scholarships totaling \$360,000.00. I have also successfully officiated two patents and actively published a number of refereed academic articles. All of which happened concurrent to

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undertaking administrative activities through both programs, advising M.S. and Ph.D. students, and serving on campus-wide Ph.D. committees.

Additionally, I have taken part in several external/international collaborations, the first program of which lasted for 12 years started in 1995. This program involved developing the curricula for a 5 year joint program between IIT and International School of Technology at the School of Mining and Metallurgy in Krakow, Poland. My responsibilities included designing courses, teaching seminars, and conducting collaborative research at both universities. Through this collaboration, I have been able to generate about \$50,000 in scholarships for Polish graduate students who came to IIT to work on their thesis and coursework. Between 1999 and 2002, I also collaborated with the Gas Technology Institute (GTI) in Chicago, working on an environmental management project that was designed to carry out environmental risk assessment at South Jersey Gas sites. In 2000, I have been invited to serve as a member of the advisory board for environmental management systems (EMS) at northern Illinois University. This appointment lasted until 2004.

By 2002, I have developed and patented a mechanism to convert biosolids and industrial waste to numerous activated carbons within a wide range of industrial applications. For example, my research team developed a pure micro-porous activated carbon that could be used in manufacturing of capacitors, lithium batteries, and fuel cells; an effective biocatalyst that was specific to removal of Phenol from industrial wastewater; and two carbon-based catalysts for removing NO<sub>x</sub> and Mercury from industrial emissions. Through these works I was awarded a guest research professor position at Argonne National Laboratory (ANL) in 1997 which continued until 2007. During my tenure at ANL I was collaborating with the chemistry and physics departments on developing new materials from industrial waste for a wide range of industrial applications, including manufacturing of lithium batteries. By 2002, my research achievements have been reported nationally and internationally in addition to being cited by U.S. engineering magazines such as Chemical Engineering News, Civil Engineering magazine, Waste News and USA TODAY.

The second period of my academic carrier started in 2002 when I accepted a tenured position as associate professor and academic director of the EM program at Stuart school of business. While the main focus of my academic activities (research, teaching and administration) between 1995-2002 was on cleaner production design, between 2002-2006 as a business school faculty and academic director of the EM program I directed my focus toward managing the academic affairs of the EM program, developing environmental management courses and research projects that were both specific to industrial environmental waste management and economic risk analysis, and design of sustainability-specific strategies. From 2009, I specifically focused on studying the decision making models that were specific to the areas of environmental management and sustainable development.

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Continuing with my external collaborations, as academic director of the program and under the direction of the Dean of the business school, in 2004 I initiated a 4+1 program with the department of chemical engineering at the Technologic de Monterrey, in Monterrey. This program resulted in securing a HED-USAID grant that supported a student exchange program between IIT Stuart and Technologic de Monterrey in Mexico for 4 years. This program has led to the development of several successful joint research projects such as the award winning *KlarAqua* purification system and its business model for global implementation, and the design of solar-based water pumping and distribution system for rural areas of Mexico. The award winning *KlarAqua* project which started in august 2005 aimed at creating a cost-effective water purification system that could provide a permanent solution to the problem of water pollution and shortage, easy access to safe drinking water, job creation in developing nations, and disaster mitigation in remote areas of the world. The design and associated business plan for implementation of the *KlarAqua* have placed IIT in the first place in the US April 2006 “Idea to Product” competition which was held by Purdue University at the San Jose State University.

While residing at business school I have had the pleasure of working closely with the IIT engineering schools offering my professional and academic experience towards developing new interdisciplinary programs between business and engineering schools, both internally and externally. In 2004 I was in charge of developing draft curriculums for two different interdisciplinary undergraduate business programs at Stuart. In collaboration with business faculty, I have completed this task and provided school with the first drafts of Stuart’s undergraduate business programs in 2005. These programs differed with regards to their focus and concentration on the types and the nature of technical courses included in the each curriculum.

In late 2006, I focused my work more towards research, publications and implementation of Stuart’s first Ph.D. program in sustainable operation (Ph.D. in management science with concentration in sustainable development). Although I designed and proposed this program when joining Stuart in 2002, I was able to formally introduce this program to Ph.D. students in 2006. To date program has been successfully executed and grown. The first Ph.D. student focusing on sustainable economic development was graduated in May 2011. Due to interdisciplinary nature of the program, we are now collaborating with university centers and institutes such as WISER (Wagner Institute for Sustainability and Energy Research) and Galvin Power Centers at IIT. Between 2006-2012 while developing our Ph.D. program, and multiple sets of new courses to support it, I have also published a text book on “Practical Sustainability”, multiple refereed articles and initiated collaboration with UIC business school to work on joint research projects.

Externally, I have continued to collaborate with many universities and research centers. Examples include working with American Institute of Architecture (AIA) in 2009 on a project

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that aimed at designing sustainable economic development programs for Orange, MA. This experience resulted in design of Sustainable Entrepreneurial Economic Development (SEED) program at Stuart that aimed at development of jobs and sustainable economy in rural areas of America.

In 2012, I was invited to lecture on “Design of an Ecology of Knowledge for Sustainability” at Zhaw School of Management in Switzerland. Since my visit in May of 2012, I have been actively working with Zhaw School of management in promoting both education and research in the areas of business sustainability. I published a paper in December 2012 as a result of this collaboration.

I have designed and offered an interdisciplinary research project in collaboration with Professor Guy Fournier at Pforzheim University in Germany Institute. This project has supported design of an inter-professional project (IPRO) course that was offered in spring semester 2013 at both IIT and Pforzheim universities. This course provided opportunity for students and faculty involved to collaborate “on-line” on design of a business case for using electric vehicles as small power plants in the grid systems while keeping in mind economic systems of the USA and Germany.

My current funded projects include Illinois Smart Grid Regional Innovation Cluster (ISGRIC) grant, a pilot program to support small business participation in regional economic “clusters”. This project geographically concentrated groups of interconnected businesses, suppliers, academic institutions, service providers, and associated organizations (2010-2013), and the Pathways to Cleaner Production in the Americas through Integration of Business, Engineering and Environmental Education that is funded by Higher Education for Development (HED). This project focuses on integration of industry, universities, and government to promote cleaner production and sustainable operation in 6 different countries in Latin America (2012-2015).

During the last 20 years I have always worked beyond the boundaries of a traditional academic setting. I have been pioneer and taken leadership roles when developing academic programs and research projects. I have insisted on the development and utilization of novel strategies that can create a network of skilled people who are also problem solvers in order to transpire my visions for an education that has no boundaries. I have compelled students to innovate, and explore knowledge beyond classroom settings. As a result many projects and program I engaged with have provided positive experience for our students. For example, a team of students who I advised won first place in Motorola 2008 Technology and Business Plan Competition; and one of my current PhD. projects was selected as one of the best emerging new Ph.D. research and was presented by my Ph.D. student at Switzerland Zhaw School of management in December 2012.

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As indicated in my brief biographical sketch, and my resume, my entire academic carrier has been involved in designing and leading innovative academic programs beyond “business as usual”. I have undertaken technical research that resulted in multiple patents and many refereed publications, worked nationally and internationally with leading universities, developed, managed, taught and conducted research in innovative interdisciplinary programs that utilized all of the resources not only at IIT, but also those of national laboratories, international universities, and programs.

I have designed academic curriculums ranging from undergraduate to Ph.D. programs, developed and taught courses in such academic spectrum, advised students, and managed entire EMS program between 1995 and 2006. My research to date has resulted in design of multi-criteria decision making models for effective management of environmental and sustainability focused projects, and those specific to greening supply chain. I am enthusiastic about understanding and assessment of the need and necessity for developing new measurements of economic performance and social progress according to the core trust of sustainable economic development.

During my academic carrier I have also enthusiastically oriented my goals on maintaining excellence in both leading school’s academic programs and providing services at university. Accordingly, I have received the Julia Beveridge award in March 2001 for my educational contributions and university services based on the student/faculty evaluation of my work.

I have always collaborated with and drawn upon the expertise of the faculty in such areas as engineering, economic analysis, commercialization, and marketing while writing and submitting joint and interdisciplinary grant proposals. These types of interdisciplinary activities have directed my work and resulted in achieving excellence in education and research at my school. While considering a wide range of markets, scenarios of economic developments, globalization, and evolvments in the economic, policy and energy systems, the focus of my research ties to developing industrial operations for a low carbon economy.