Business Lessons

*BICB students learn about entrepreneurship through new course*

On a Monday evening in April, several BICB Program students took center stage to share their analysis of companies that found a new sweet spot in the marketplace for their innovations or business twists.

Using the inspiration of Blue Ocean strategy, where organizations work to generate new space in the market, students selected an organization and looked at the factors that set it apart for smoother sailing.

From the easy-to-rent ZipCar to the low-cost Megabus, they described the entrepreneurial approaches and decisions that increased value for consumers or addressed their needs in a new way. Through these student presentations, a series of assignments, guest speakers, and classroom discussions, BICB students are gaining a solid introduction into the world of entrepreneurship.

The BICB Program recently added BICB 8970 Entrepreneurship and Leadership Seminar to its curriculum. Former teacher, executive, entrepreneur, and now consultant and Entrepreneur-in-Residence at the University of Minnesota Carlson School of Management, Linda Hall Keller brings a wealth of knowledge and experience as co-leader of the BICB course (see related story on page 2).

“First and foremost, I want to offer students exposure to entrepreneurship, because I think it’s really important to explain to students what it means to be an entrepreneur,” she says.

“Understanding what the entrepreneur does can help students understand what it takes to bring an innovation to market.”

Even if students do not pursue an entrepreneurial avenue themselves, increasing their knowledge about entrepreneurial considerations puts them in a better position to work with an entrepreneur or to move an idea or innovation forward within their own organization, says Keller. Scientists and engineers with those perspectives become even more valuable assets.

“It is absolutely not true that if you build it, they will come,” says Keller. “Knowing what it takes to be successful in business increases your ability to sell your idea or product within an organization or externally.”

She also works to dispel some myths about entrepreneurs – for example – that hard times hit entrepreneurs even harder. In fact, economic downturns have been the impetus for the start of some of the country’s largest technology leaders, such as Microsoft and Texas Instruments. Another common misperception is that entrepreneurs are very young. Of American-born founders of tech companies between 1995 and 2005, there were twice as many over age 50 than under age 25. Most successful entrepreneurs have had 10 years experience in the industry.

The class looks at the spectrum of building a business, and it does so in part through the eyes of experienced business leaders.

“In all my classes, I bring in successful entrepreneurs who can share their experiences with students,” she says. “I want honest and candid discussion. I want them to tell about what went well and what was painful.”

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The insider view includes examples of social entrepreneurship; entrepreneurship within a company; the pre-revenue startup phase; and the rapid growing entrepreneurial business with speakers such as Drew Flaada from IBM Rochester; Doug Ruth, CEO of Earthclean; Paula Meyer, CEO of Ngong Road; John Seaberg, CEO of Neochord; Al Berning, CEO of Hard Core Computer; Ben Bowman, CEO of General Blood; Alex Cirillo from 3M; and Barbara Hensley, CEO of Hope Chest for Cancer.

Keller also shares her own example with students: In 2002, she assumed the reigns of a fledging company that, under her leadership, was named as one of the 10 most innovative disruptors since 1997 by *Forbes* magazine.

In 2002, she was recruited to run a newly established startup company with an interesting concept: Offering rapid diagnosis and prescriptions for common illnesses in a retail setting, at the time Cub Grocery Stores in the Twin Cities. The challenge? The company was already significantly in debt, and her compensation would be deferred.

She agreed to the CEO spot despite the personal financial risk.

“I had fallen head over heels in love with this company and wanted to see it succeed,” she says. She shut down offices to save money, pursued new financing, and re-launched the company with significant changes that included a new name, MinuteClinic, a new business and service model, and new locations.

With an emphasis on quality at all times, MinuteClinic quickly grew. In 2004, the organization launched a national rollout with leading retail partners, with 71 clinics in 10 states by the end of 2005. In 2006, MinuteClinic sold its operations to CVS/Pharmacy for $214 million.

From details about operations and strategy, BICB students learned that success is often a chaotic journey with very few easy decisions. “There is no road map,” she tells the students. “No one comes with all the right answers.”

To reinforce their classroom experiences, students wrote summaries of what they learned from the discussions with each entrepreneur. Examples of other assignments include a paper that describes their personal values and the impact of those values on their leadership decisions, as well as a case study of a successful or unsuccessful startup company.

For BICB students, the class is offering a unique opportunity.

“I get a better picture of the overall scale of starting a business in terms of funding, people, and intangibles like expertise and industry knowledge,” says Michael Vieths, BICB student who works full time at Dell Compellent as a software engineer. “I think the topic is a good one.”

Lending Expertise

Linda Hall Keller enjoys the worlds of business and education, and her work at the University of Minnesota and the University of Minnesota Rochester marries the two in a way that enhances the education of BICB Program and Carlson School students.

Keller teaches the new Entrepreneurship and Leadership Seminar in collaboration with Claudia Neuhauser, Ph.D., UMR vice chancellor. She comes with the perfect combination of credentials in education, including a Ph.D. in educational administration, and business.

She began her career as a special education teacher and school social worker, including work at the Minneapolis and Hopkins school districts. There, her entrepreneurial roots began to take hold as she designed innovative educational programs. She left education to work at Honeywell, eventually becoming vice president of the Consumer Business Group. She served as president of Ceridian Performance Partners at Ceridian Corporation, where she launched the first global integrated work/life and Employee Assistance Program.

She uses her work as CEO of MinuteClinic as a case study for the BICB class (see related story). As Entrepreneur-in-Residence at the Carlson School, she teaches undergraduate and MBA students. She also is a consultant to local firms and serves on the boards of Laastari/R-Clinic, Ltd, General Blood, and Primex. She is a founding member of the Minnesota Chapter of Women Corporate Directors.

*Twin Cities Business* named her Outstanding Director in October 2010. She was also named Director of the Year by Twin Cities Women in the Boardroom in November 2010, and was selected as one of the Top 50 Hardest Working Board Members by the *Business Journal* in 2003, 2005, and 2006.

“What I love about business is that you’re always learning – about consumer and market trends, economics, culture, politics, emerging technologies. Business requires you to stay current. I love that in business there is rarely only one ‘right’ solution, and often the path to success is uncharted territory. You have to figure it out, and there is no road map!”

[www.r.umn.edu/bicb](http://www.r.umn.edu/bicb)
Investment in Research and BICB

The Hormel Institute builds collaborations that support its work to uncover cancer-related breakthroughs

After receiving a seed grant from the BICB Program, researchers at The Hormel Institute began projects that involved developing computational modeling and simulation programs to help in the discovery of inhibitors against cancer-related proteins.

The seed grant helped with the initial set-up costs for work in the laboratory, and the project produced the kind of promising results that attracted the attention of the National Institutes of Health (NIH). The Hormel Institute received about $1 million in funding from the NIH to continue the research.

The seed grant more than fulfilled its purpose, supporting the important work of the Institute in improving health and demonstrating one of the many benefits to the collaborations that form the BICB Program.

As Associate Director of The Hormel Institute, Ann M. Bode, Ph.D., was involved with early discussions that led to the establishment of the BICB Program. “We have always had a strong association with Mayo Clinic, and we also had started working closely with IBM,” she says. “The idea of BICB just seemed like a natural step. We were very willing to participate.”

The Hormel Institute has been a great supporter of the BICB Program, says Claudia Neuhauser, Ph.D., UMR vice chancellor. “Their work is extraordinary, and their contributions to developing and evolving the BICB Program are very much appreciated.”

The BICB Program encourages the kind of interdisciplinary work that strengthens research in the area of biomedical informatics and computational biology, says Bode, and those areas are critical ones to advancing medical research. The diversity of the participants – with varied backgrounds – also makes it a unique place.

There is also tremendous value in training the future scientists who will be able to approach problems with an interdisciplinary perspective, says Bode. This fall, the Institute will welcome a BICB Ph.D. student who will work hand-in-hand with Institute researchers.

The Hormel Institute is very familiar with the importance of graduate and postdoctoral students. Established in 1942 as part of the Graduate School of the University of Minnesota, The Hormel Institute focuses on cancer-related research that has led to the discovery and naming of omega 3 and omega 6 fatty acids, the connection between obesity and cancer, and cancer preventive qualities of resveratrol in foods like red wine and grapes and of compounds in green and black teas.

Divided into 10 research sections, Institute research groups explore areas such as cellular dynamics, cellular and molecular biology, nutrition and metabolism, translational cancer research, and tumor suppressors and cancer susceptibility. Bode and Executive Director Zigang Dong, M.D., Ph.D., and McKnight Presidential Professor in Cancer Prevention, run laboratories that investigate natural food compounds, such as green tea, that may bind with a protein to help suppress cancer.

Located in Austin, Minn., The Hormel Institute completed an expansion project in 2008 that added a new building, which houses 20 state-of-the-art science laboratories, more than doubling the size of available space for research. The project also included a renovation of the existing building. The new space has helped expand the Institute’s collaborations with researchers throughout the world, says Bode.

The new space and an investment in cutting-edge equipment and technology allowed the Institute to establish the International
Innovations at Work

**BICB Program supports business development**

With his role in building strategic alliances and partnerships for IBM Systems and Technology Group in Rochester, Paul Mattson welcomed the addition of the BICB Program in 2007.

Rochester was ready and eager for a true local university presence including undergraduate and graduate programs, he says, and the Biomedical Informatics and Computational Biology (BICB) Program represented an important step for the community.

“The BICB Program was the first significant program that manifests the vision of the Governor and Legislature as a new way to leverage partnerships in education,” says Mattson. His involvement with BICB began early, as he participated in discussions about the program’s organization and launch, as well as reviews of the curriculum.

Mattson was a natural choice to help the BICB Program forge its strong collaborations. His current position with information technology leader IBM involves identifying and nurturing collaborations, partnerships, and entrepreneurial pursuits that support the organization’s growth.

His educational background also fits well with the intersection that bioinformatics and computational biology occupies.

Mattson received his bachelor’s degree in computer science and mathematics from Luther College in Decorah, Iowa, and his master’s degree in computer and information science from the University of Minnesota, as well as his master of science in the management of technology degree from the Massachusetts Institute of Technology. He also serves as an adjunct faculty member for the Augsburg College MBA Program, teaching the Strategic Technology course, and has taught at Luther College.

When it comes to business development, the combination of research, education, and industry is a powerful one, says Mattson. Working with research faculty and students helps IBM in developing innovations and meeting customer needs. In addition, IBM needs scientific and engineering talent, and building relationships with educational institutions offers a rich source for talent and a way for IBM talent to enhance their development. These elements are present, for example, in Silicon Valley and contribute to the success of the region.

Mattson does not teach in the BICB Program, but serves in a business development capacity. “The idea is to be available to students to help provide advice for commercialization of research,” says Mattson.

To that aim, Mattson has taken part in a panel, sharing information with BICB students and supporters on the topics of entrepreneurship, venture capital acquisition, and technology transfer. He also has attended a new BICB course for students on entrepreneurship (see story on page 1). “That course gives students a deeper dive into what it takes to be an entrepreneur,” he says.

Most recently, he was invited to meet with students of the BICB Journal Club, an organization of BICB students who meet to discuss topics of interest. “We talked about taking new ideas within an organization and moving them forward – taking research and commercializing it and how to navigate a career of innovation in a commercial organization.”

The interdisciplinary nature of the BICB Program makes it fertile ground for advancements. “So many cool innovations and breakthrough technologies happen between the edges of disciplines and silos,” he says. “And that’s where bioinformatics and computational biology lie – a place that is absolutely ripe for results.”

“These students are working side by side with experienced researchers,” says Mattson. “They also are part of the collaboration with industry practitioners. I think that is as powerful a mechanism for getting students into the mindset that they are doing important work.”

The BICB community is continuing to grow and add additional value, says Mattson. “It’s good for our community to have University of Minnesota Rochester and the BICB Program here. It’s good for the community and it’s good for IBM.” Mattson looks forward to the day when new ventures, contributing to the region’s economic development, can trace their roots back to students, learning, and research from the BICB Program.
Interdisciplinary Pull

BICB Program helped student expand his skills and opportunities

As an undergraduate math major at Notre Dame, Zach Fogarty also pursued his interest in biology and genetics. When he completed his degree, he wanted to continue exploring those areas and began looking for graduate programs.

He found the Biomedical Informatics and Computational Biology (BICB) Program and was attracted by its ability to bring together expertise in computing and biology and medicine. The program offered him a unique opportunity to better his understanding of computer science while at the same time applying and augmenting his knowledge of biology and genetics.

“It seemed like a great fit,” and it was, says Fogarty. “I liked the interdisciplinary nature of the program, with different classes and professors from different fields.”

The program more than met his expectations, with computer science classes that were focused on genomics and biology. His favorite class explored the topic of functional genomics. “I was able to take what I learned and do more projects,” he says.

Fogarty decided to pursue the program’s Plan B option, where he was able to take more classes and develop a final project. For his project, he completed a paper that looked at genetic interactions and genetic networks. His work in the program helped round his background.

“I think taking the computational classes was good for me,” he says. “I didn’t have as much of an understanding in computation than I did in the biology area.”

Fogarty and other Rochester-based students were able to participate in classes that were taught in the Twin Cities through instructional television, interacting with faculty and other students who were based in the Twin Cities. He enjoyed working with his fellow students and appreciated the camaraderie in the classroom.

“Students and faculty from different backgrounds gravitate toward BICB, and they bring their diverse strengths to it,” he says.

Fogarty began the program in fall 2009 and graduated in December 2010. He walked away with greater expertise in an ever-growing field, and he recommends the program to others.

“I was hoping to find some kind of analysis position with medical research or biological research,” says Fogarty. “I was really interested in dealing with genomics data. This job builds on my interests and abilities, and I’m really enjoying the work.”

Did You Know

• The BICB Program began offering master’s and Ph.D. degree programs in 2008.
• There currently are 21 students in the master of science degree programs and 20 students in the Ph.D. program.
• The BICB Program offers flexible options: Students can work full-time and pursue their degree.
• The BICB Program is one of only less than a handful of such programs nationwide.
• BICB graduate faculty include 51 scientists and researchers from the University of Minnesota Rochester, the University of Minnesota Twin Cities, the Hormel Institute, Mayo Clinic, and IBM.
• The BICB Program uses technology to expand its educational reach, with classes that can simultaneously meet in Rochester and in the Twin Cities.

For more information about BICB master’s degree or Ph.D. degree programs, visit www.r.umn.edu/bicbgraduate.
Solutions at the Intersection

Winter BICB Symposium highlights the use of new interdisciplinary models

At the winter 2011 BICB Research Symposium, speakers and participants shared their perspectives about the difference that the collaborative and interdisciplinary approach of BICB is making in education and research.

In a few years, the University of Minnesota Rochester (UMR) has grown rapidly and is continuing to grow, with about 530 students on campus, says UMR Chancellor Stephen Lehmkuhle, Ph.D. As a contributor to this growth, BICB has helped lead the way with “great synergy and collaboration.”

More than 100 participants came to the January 14 symposium in Rochester, showing strong support for BICB and the work of its students, faculty, and industry partners.

From the start, the program emphasized collaboration, leveraging strengths from academia and industry to meet educational needs and advance research, says Claudia Neuhauser, Ph.D., UMR vice chancellor. “The very nature of bioinformatics and computational biology requires cooperation among diverse areas,” she says. “We are a place for industry scientists, faculty researchers, and students with diverse backgrounds to come together in search of innovative solutions.”

Interdisciplinary approaches to complex challenges

Indeed, the complexity of cancer study itself requires research that considers many different perspectives in search of answers, says Frank Prendergast, M.D., Ph.D., professor of pharmacology and biochemistry and molecular biology, College of Medicine, Mayo Clinic; founding director, Mayo Clinic Center for Individualized Medicine; and one of the symposium's keynote speakers.

“The problem of cancer illustrates this extremely well,” says Prendergast, whose current research focuses on drug design and discovery and computational biology. He used a case study of a patient who was successfully treated for lung cancer 20 years ago, but now faced a relapse. What triggered the relapse? Was there residual of the disease that wasn’t possible to detect?

While all is clearly not known about the whole progression of cancer, analyzing data offers both promise and interdisciplinary challenges. “We need a broader construct of what constitutes data integration,” he says. “We need to understand the complexity of networks.”

Shifts in graduate education

Graduate education plays an important role in advancing research, says Henning Schroeder, Ph.D., who is currently leading the implementation of the University of Minnesota’s plans to restructure and streamline graduate education and also spoke as a symposium keynote speaker.

While the United States traditionally has been considered among the best in the world for its graduate education, countries throughout the world are changing their approach. In some countries, graduate programs combine independent research and courses that focus on transferable skills and thus open up career paths inside as well as outside academia.

Encouraging students in U.S. institutions to start research earlier is one way to help ensure competitiveness, as well as supporting interdisciplinary work and interactions with industry, he says.

“Here [at BICB] we have a significant advantage in the way we do interdisciplinary graduate education,” says Schroeder. The University will continue “nurturing, promoting, and expanding interdisciplinary education” in the future.

New models

Universities are expanding the traditional model of basic research to incorporate more applied research, which, in turn, has led to increased collaborations with industry, says Carlos Sosa, Ph.D., senior technical staff member in the High-Performance Computing Development Solutions Group at IBM. As symposium speaker,
Sosa addressed the benefits that arise from successful industry-university collaborations, such as the BICB Program.

“Based on what we are beginning to see for a model, we are in a good place,” says Sosa. “You have a university and industry partnership that is really interested in developing a long-term relationship.”

The key to establishing the long-term relationship is identifying mutual benefits for all parties in the collaboration. The university gains access to other funding sources, cutting-edge technology, and feedback. Industry gains access to basic scientific knowledge, faculty members and graduate students, and the ability to leverage university funding.

There are many considerations in such collaborations, such as intellectual property and publishing. Successful partnerships, such as the BICB Program, require dedication and work, trust among organizations, multiple opportunities to interact, and the infrastructure to support interactions, he says. “What makes this possible is to have key individuals who are fostering these types of relationships,” he says. “Without that, it is very difficult to develop partnerships.”

Training ground
The BICB Program is also filling a need for industry by training scientists, researchers, and potential entrepreneurs. A career panel featured practical advice for BICB students. Panel participants included Chad Artley from Hardcore Computing; Michael Good, program director of the Advanced Systems Software organization at IBM’s Systems and Technology Group in Rochester; Linda Murray, staffing consulting at St. Jude Medical; and H. Birali Runesha, Ph.D., assistant director of scientific computing at the University of Minnesota Supercomputing Institute.

Organizations are interested not only in the quality of technical skills, but also in interpersonal skills and adaptability to the environment and changes, say the panelists. Students who complete internships or work jointly on research projects with organizations are in a good position to demonstrate their value for employment. Preparation before interviews and enthusiasm are also pluses during the hiring process.

Panelists also stressed that it’s important to continue learning throughout your career and to stay open to different types of learning experiences.

Student spotlight
After the panel discussion, two BICB Ph.D. students presented updates on their research: Loren Gragert described his work on genetic ancestry and HLA matching in bone marrow, and Dimitrije Jevremovic described his work on computation and analysis of metabolic pathways. The event also featured an opportunity to view student research posters and a display from the BICB Program.
Milestones

• **Dimitrije Jevremovic**, former BICB trainee and Ph.D. candidate in computer science with a BICB minor, recently received the prestigious IBM Ph.D. Fellowship for a second year. The fellowship supports his research on the analysis of metabolic pathways in biochemical reaction networks.

This research is a direct outgrowth of the work that he began as part of a BICB traineeship in 2007. The fellowship will provide a stipend and cover educational expenses, as well as help ensure access to computing resources for his work. Carlos Sosa, Ph.D. and BICB faculty member from IBM, serves as Jevremovic’s IBM mentor and co-advisor.

“This recognition of the importance and quality of Dimitrije’s work is well deserved and greatly appreciated,” says Daniel Boley, computer science and engineering professor, BICB faculty member, and Jevremovic’s advisor. “With this fellowship, Dimitrije has been able to make substantial progress in his research, developing novel divide-and-conquer techniques to compute the elementary pathways for much larger biochemical networks, while taking advantage of the high-performance computers at IBM and MSI.”

• **Joseph Metzger**, professor and chair of the Department of Integrative Biology and Physiology, and **Yuk Sham**, assistant professor, assistant director of the Center for Drug Design, and BICB faculty member, have been awarded the University of Minnesota Interdisciplinary Informatics Seed Grant for 2011-2012 from the Office of the Vice President for Research. They will lead a study on computer simulation and physiology of the ischemia-dependent troponin molecular switch mechanism in the heart.

• **Chad Myers**, assistant professor of computer science and engineering and BICB faculty member, was selected as one of the University’s 2011-2013 McKnight-Land Grant Professors. Myers also contributed to four recently published research reports, which resulted from work that was partially supported by BICB seed grants and traineeship funds.

For information about BICB Programs, visit [www.r.umn.edu/research/bicb/index.htm](http://www.r.umn.edu/research/bicb/index.htm) or contact:

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