

MASTER OF SCIENCE IN

## **Management of Technology**

*Academic Year 2011 - 2012*

### **Prospective Student Info Pack**

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*College of Science and Engineering*

## Management of Technology

### Overview

The Master of Science in Management of Technology (MOT) was launched at the University of Minnesota and the College of Science and Engineering's Technological Leadership Institute (tli.umn.edu) in 1990. It is one of the first, and experts in the field of management of technology consider it one of the foremost, MOT programs in the world.

The MOT is an accelerated, interdisciplinary program for experienced technology-based professionals — with at least 5 years of work experience and demonstrated leadership potential — seeking to increase their leadership capabilities in business, management, and advanced technology issues.

The MOT is delivered in an executive format: Students start in the fall, attend class one day per week (8:00 a.m. - 4:15 p.m.), alternating Friday and Saturday, and finish the lockstep curriculum in four semesters. Interactive classes foster the exchange of knowledge and ideas, which is one of the program benefits most frequently cited by MOT students and alumni.

As a discipline, management of technology focuses on the interface of business, technology, engineering, policy, law, and science. The U of M's MOT program focuses on this interface and views technological innovation as a crucial driver of corporate growth.\*

\*Research findings of 1987 Nobel Laureate in Economic Sciences and MIT professor Dr. Robert Solow proved that more than 60% of the U.S. economy is driven by technology.

MOT students learn to:

- leverage technology across all facets of business operations — from R&D to successful market launch
- master the basics of business: finance, accounting, operations, marketing, R&D
- lead people, projects, and processes
- map, track, and forecast existing/emerging technology trends and evaluate global opportunities and threats
- synergistically apply what they've learned and bring direct value back to their organizations with the MOT Capstone Project class

### Why MOT?

Graduate school is a serious investment of money and time. You want to be sure to select a program that meets your career needs and will pay off in a multitude of ways. The MOT program includes a core of general business topics (similar to an MBA) plus unique topics, which provide a competitive advantage to individuals who seek increased leadership opportunities in a technology-intensive business environment.

#### **MOT Program Advantages**

**MOT faculty.** The MOT program brings together a world-class instructional team from business, law, engineering, science, and public affairs. Because of the demands of the program, MOT faculty must have extensive teaching, research, and corporate experience (see pages 8–11 for further details).

**Cohort-based learning environment.** An interactive learning environment lets experienced, like-minded technology professionals — with an average of 12 years of work experience — learn from each other.

**Practical, unique curriculum.** Case studies and relevant assignments apply directly to MOT students' everyday work needs and provide a strategic viewpoint of corporate and worldwide business issues.

**Managing technology from a global perspective.** A global perspective of business, management, and technology is emphasized throughout the program. In addition, students attend a two-week, on-site international class.

**MOT Capstone Project.** The final, work-based MOT Capstone Project delivers exceptional value to students' careers and companies. Alumni regularly state that the return on investment from the MOT Capstone Project alone exceeds the program cost (see page 7 for a full course description).

**Degree completion.** With 30–35 students per MOT class, the faculty-to-student ratio is excellent. MOT graduation rates reflect this program advantage: The combined '07, '08, and '09 graduation rate is 99%.

### MOT or MBA?

Some of the key differences between the MOT and MBA programs include: the **MOT learning team, curriculum focus, and outcomes.** (Please also see page 2.)

#### MOT Learning Team

Along with leadership potential, MOT students must have five or more years of science, engineering, or technology-based industry experience, and the program capitalizes on this experience. MOT faculty encourage and facilitate classroom interactions, which challenge and use MOT students' pooled knowledge. MOT students progress as a cohort: i.e., they learn with and from each other for the duration of the program. (Note: Alumni report an additional 60% knowledge gain from cohort interactions.)

#### MOT Curriculum Focus

There are general business and management courses as well as unique, more technology-specific courses. If you seek increased managerial and leadership abilities and opportunities in a technology-intensive business environment, you should consider the MOT program. The table below provides further curriculum details.

#### Outcomes

The following paragraphs illustrate both overlap (e.g., increased leadership and managerial effectiveness) and differences (e.g., technological leadership, graduation

rates, and the MOT Capstone Project) between MBA and MOT degree outcomes.

**Degree completion and MOT Capstone Project.** As described on page 2, graduation rates and the **MOT Capstone Project** are important program advantages.

**Technological leadership development.** The tech-based leadership topics for which the MOT program is world renowned include: Innovation management, strategic technology analysis, pivotal and emerging technology development and commercialization, IP and global strategies, and technology foresight and forecasting. Alumni report that their unique MOT knowledge and skills set them apart from the crowd and provide immediate and continued (career-track) competitive advantages.

**Increased managerial effectiveness.** Along with increased abilities come increased job responsibilities and rewards. MOT alumni typically report increased managerial responsibilities (and salary) during and after the program.

**Increased job satisfaction.** For many professionals, the greatest reward of work is a personal sense of challenge, pride, and accomplishment. MOT graduates report a 25% increase in job satisfaction after completing the program, which directly correlates to the increase in their managerial responsibilities.

**MOT Curriculum:** Most MBA programs have general requirements plus concentration-specific courses (~80% of MBA students pursue finance or marketing concentrations). Columns 1–2 compare typical MBA general requirements to courses or topics from the MOT curriculum. The MOT curriculum has two components: business foundation courses (accounting, finance, information resources, marketing, operations) and the concentration courses listed on the right. Overall curricular overlap with an MBA/EMBA program is ~50%, but **content of the courses highlighted in blue is unique to the MOT program.** See pages 5–7 for further MOT course details.

Comparison: MBA & MOT Content Overlap		MOT Concentration & Supporting Courses	
<p><u>Typical MBA General Requirements:</u>*</p> <ul style="list-style-type: none"> <li>Accounting I &amp; II*</li> <li>Business environment</li> <li>Ethics</li> <li>Finance</li> <li>Information resources management</li> <li>Marketing</li> <li>Operations management</li> <li>Organizational management</li> <li>Statistics/Data Analysis*</li> </ul>	<p><u>Comparable MOT Courses/Topics:</u></p> <ul style="list-style-type: none"> <li>Accounting*</li> <li>Business environment (topic)</li> <li>Ethics (Corporate Responsibility)</li> <li>Finance</li> <li>Information resources management</li> <li>Marketing</li> <li>Operations management</li> <li>Organizational management (topic)</li> </ul>	<p><u>Concentration: Strategic Management of Technology &amp; Leadership</u></p> <ul style="list-style-type: none"> <li>Communication</li> <li>Conflict Management</li> <li>Corporate Responsibility (Ethics)</li> <li><b>Developing New Technology Products</b></li> <li><b>International MOT Project</b></li> <li><b>Macroenvironment of Technology</b></li> <li>Managing Intellectual Property</li> <li><b>Managing Organizations in a Technological Environment</b></li> <li><b>Managing Technological Innovation</b></li> <li><b>MOT Capstone Project</b></li> <li><b>MOT Leadership Effectiveness</b></li> <li><b>Pivotal &amp; Emerging Technologies</b></li> <li><b>Project &amp; Knowledge Management</b></li> <li><b>Science &amp; Technology Policy</b></li> <li><b>Strategic Management of Technology</b></li> <li><b>Strategic Technology Analysis</b></li> <li><b>Technology Foresight &amp; Forecasting</b></li> </ul>	

\* The MOT program has one intensive accounting but no statistics/data analysis course.

## Frequently Asked Questions

The Master of Science in Management of Technology (MOT) was launched at the University of Minnesota's Technological Leadership Institute in 1990. It is one of the first, and management of technology experts also consider it one of the foremost, MOT programs in the world. The following are some frequently asked questions about the MOT program.

### What are the admission prerequisites and requirements?

The MOT admission requirements are the prerequisites: 1) A four-year undergraduate degree from an accredited school; 2) Five or more years of science, engineering, or other technology-intensive work experience; 3) Demonstrated leadership experience or potential.

### Is the MOT a master's in information systems/MIS?

No: Technology in the MOT program is considered any pragmatic application of science or engineering.

### How do the MOT and MBA curricula compare? Why would I choose the MOT?

Like an MBA, the MOT includes **general business, management, and leadership topics**. However, MOT students are on a tech-based leadership track. They choose the MOT because they have a vision of the potential of the program's **unique, technology- and future-focused topics**, that prepare them to *leverage technological leadership and innovation to drive business*. MOT graduates can assess and implement marketing and cost savings strategies but, in addition, they have unique leadership skills related to: Strategic technology analysis, innovation, and management; new technology product development and commercialization; mapping, tracking, and forecasting technologies and business development.

Students also benefit from the program's distinctive learning environment, including: Interactive classes orchestrated by senior, interdisciplinary faculty (see page 8) and a cohort of 30 to 35 high-potential professionals, who have an average of 12 years of tech-based work experience. Students immediately apply their new skills at work, and the work-based **MOT Capstone Project** delivers extraordinary professional value.

### What college grants the MOT degree?

The MOT is a master of science from the University of Minnesota's Graduate School and the College of Science and Engineering.

### What do alumni say about the program?

In a 2009 survey, MOT alumni reported: 1) Significant career impact and increased job satisfaction during and after the program; 2) The MOT program prepared them for critical, immediate skill and work needs and is even more applicable to their future career objectives; 3) They frequently recommend the program to others; 4) *Ninety-six percent (96%) were satisfied-highly satisfied with the MOT program.*

### How do students work full time and complete the MOT in four semesters?

Class is 8:00 a.m.-4:15 p.m. on one Friday or one Saturday per week. MOT students are highly motivated, and their success is optimized by the program structure; e.g., peer-enhanced learning, formal study groups, an executive format, and exceptional student-to-faculty ratio. Career impact and 100% graduation rates confirm the program delivers the leadership development students and companies require.

### How much time per week do students spend studying?

Depending on the courses, assignments, and each student, it varies from 10 to 20 hours per week.

### Why require five or more years of tech-based work experience?

The MOT curriculum is designed to meet the work and career development needs of seasoned technical professionals. Also, everyone participates in the learning process, and MOT students expect to learn from one another.

### How is the length of work experience calculated?

The MOT admission committee starts counting the work experience at the point where you started your first full-time, tech-based position after receiving an undergraduate degree. You meet the basic eligibility after five full-time-years working in a technology-intensive field. Eligibility is also based on demonstrated leadership experience or potential. Applicants with three to five years of work experience have been admitted when they have demonstrated exceptional professional maturity, leadership, and managerial ability.

### What if I don't have five years of work experience?

Most MOT applicants prepare for one or more years to start the program, and it is critical to the admissions committee that both the *program and time* to start are right for you. The MOT is completed in only four semesters so **future applicants can concentrate on their careers, leadership opportunities, and develop company support in the meantime**. If you think the MOT program matches your career objectives, contact Amy (see below) to RSVP for an upcoming information session.

### What is the program cost? Does it cost more than other graduate management programs? Is there financial aid?

The MOT is very competitively priced with other graduate management programs. As you compare costs, be sure to factor in other programs' additional fees, average yearly cost increases, and time to completion (e.g., an average of four to six years versus the four-semester MOT schedule). In addition, the value generated by each student's work-based MOT Capstone Project often exceeds the program cost. The fall 2011 – spring 2013 comprehensive\* cost is \$17,625 per semester (a 2.5% increase). Contact us to discuss promoting manager and company awareness and support, cost and ROI analysis, financial aid, and other financing strategies.

*\*The MOT comprehensive cost remains the same for the four consecutive semesters of the program and includes: Tuition, fees, and books; the international class round-trip airfare and lodging; class-day food, beverages, and parking.*

### Is the GRE or GMAT required for application?

Due to MOT applicants' extensive work experience and motivational levels and the rigorous application and selection process, GRE or GMAT scores are rarely required. However, if an applicant has already taken the GRE or GMAT, they may forward their results to the program office.

### Can I transfer credits into the MOT program?

Because of the lockstep course schedule, cohort nature of the learning experience, and study group structure, the MOT program cannot accept transfer credits.

### Is this program right for me? Can I apply for this fall?

You are the best person to answer the first question! But for more information about the program or when and how to apply, or to RSVP for an upcoming MOT information session, contact Amy at:

**Phone:** 612.624.8826

**E-mail:** <mot@umn.edu>

**If you have questions we have not addressed, please let us know. Thank you.**

### **MOT Sample Schedule**

<u>Course No.</u>	<u>Course Title</u>	<u>Instructor</u>	<u>Sessions</u>	<u>Cr.</u>
<b>Year One</b>				
<i>FALL SEMESTER I</i>				
MOT 8112	Management Accounting	Caliendo	8	2
MOT 8114	Strategic Technology Analysis	Carlson	7	2
MOT 8121	Managing Organizations in a Technological Environment	Soni	8	2
MOT 8133	Communication in a Technical Environment	Wilbers	8	2
MOT 8900	Conflict Management	Fiutak	2	0.5
Seminar	Managing Stress and Balancing Work/Life	Surprenant	1	0
Seminar	MOT Leadership Effectiveness	Surprenant	1	0
		<b>Term Totals</b>	<b>34</b>	<b>8.5</b>
<i>SPRING SEMESTER I</i>				
MOT 8111	Marketing Management for Technology-Based Organizations	Soni	8	2
MOT 8113	Operations Management for Competitive Advantage	Linderman	7	2
MOT 8122	Financial Management for Technology-Based Organizations	Rao	8	2
MOT 8214	Technology Foresight and Forecasting	Farmer	8	2
MOT 8221	Project and Knowledge Management	Smith	8	2
MOT 8231	Managing Information Resources in Technology-Based Organizations	Riggins	4	1
Seminar	MOT Leadership Effectiveness	Surprenant	1	0
		<b>Term Totals</b>	<b>44</b>	<b>11</b>
<b>Year Two</b>				
<i>FALL SEMESTER II</i>				
MOT 8212	Developing New Technology Products	Carlson	8	2
MOT 8224	Pivotal Technologies	Amin	4	2
MOT 8233	Strategic Management of Technology	Marcus	8	2
MOT 8234	MOT Capstone Project*	Amin, Polla	3	0.5
MOT 8910	Corporate Responsibility	Marcus	4	1
MOT 8920	Science and Technology Policy	Polla	6	1.5
Seminar	MOT Leadership Effectiveness	Surprenant	1	0
		<b>Term Totals</b>	<b>34</b>	<b>9</b>
<i>SPRING SEMESTER II</i>				
MOT 8213	Macroenvironment of Technology	Marcus	7	2
MOT 8232	Managing Technological Innovation	Carlson	7	2
MOT 8234	MOT Capstone Project*	Amin, Polla	*	1.5
MOT 8940	Managing Intellectual Property	Pletcher	2	0.5
MOT 8950	International Management of Technology Project <sup>+</sup>	Polla	+	1.5
Seminar	MOT Leadership Effectiveness	Surprenant	1	0
		<b>Term Totals</b>	<b>24</b>	<b>7.5</b>
		<b><u>Total Credits</u></b>		<b><u>36</u></b>

\* Master of Science thesis; work-based research project.

<sup>+</sup> The international project class is held overseas for up to two consecutive weeks.

PLEASE NOTE: Though rare, courses and instructors are subject to change without notice.

## MOT Courses

Technology management is a relatively new emphasis in business management programs. By design, the University of Minnesota's MOT stays new. To address current technology and industry issues and trends, the curriculum is updated every year. In addition, our curriculum sets a standard for the discipline.

### **MOT 8111: Marketing Management for Technology-based Organizations**

Introduction to the function of marketing strategy in technology-based organizations. Marketing industrial products, product strategy and pricing, promotion, product mix, and sales and distribution decisions. (2 cr)

### **MOT 8112: Management Accounting**

Methods for estimating and analyzing product costs and using cost information to make product mix and pricing decisions. Cases from technology-intensive firms illustrate principles of activity-based costing. Uses of cost data in managerial decision making, budgeting and control, and financial statement analysis. (2 cr)

### **MOT 8113: Operations Management for Competitive Advantage**

Overview of operations function. Impact of operations management on a firm's competitiveness and network of trading partners. Key relationships between operations and other value chain functions. Integrating operations decisions to achieve business objectives. Product-process design, quality management, supply chain management, technology management, and workforce issues. (2 cr)

### **MOT 8114: Strategic Technology Analysis**

A strategic analysis of technology including its creation, history, dynamics, and interaction with industry, society, and the economy. Technology's role in business and management; tools and techniques for technology analysis; key emerging technologies and their future significance. (2 cr)

### **MOT 8121: Managing Organizations in a Technological Environment**

General management principles for organizations, people, and business systems in technology-intensive industries. Applied managerial approaches to the project, business, and corporate levels of organizations and to the contrasting demands of entrepreneurial and established technology firms. (2 cr)

### **MOT 8122: Financial Management for Technology-based Organizations**

Overview of financial methods important to technology-based managers and organizations. Creating value within

an organization, budgeting capital, projecting financial needs, and managing working capital. (2 cr)

### **MOT 8133: Communication in a Technical Environment**

Introductory and specialized sessions focus on oral and written business communication. Presentation skills, memo and report writing, listening skills, and visual aid design and integration. (2 cr)

### **MOT 8212: Developing New Technology Products**

Review of methods and organizational strategies for developing new technology products. Critical organizational interactions between development, operations, marketing, and intellectual property strategy in the design and delivery of new technologies. (2 cr)

### **MOT 8213: Macroenvironment of Technology**

Development of anticipated social, political, governmental, and economic forces affecting technological change. Use of scenarios to respond to industry threats, opportunities, and uncertainties. Corporate strategies, including building alliances for global competitiveness. (2 cr)

### **MOT 8214: Technology Foresight and Forecasting**

Technology forecasting, assessment, and strategic foresight tools and techniques and their application in business and government decision making. Technology dynamics, development, strategy, portfolio management, and resource allocation. (2 cr)

### **MOT 8221: Project and Knowledge Management**

Application of project and knowledge management and leadership methods for tech-based managers. Project planning, scheduling, and controlling; budgeting, staffing, and task and cost control. Communication, leadership, motivation, and conflict management among team members. Concepts and processes through which an organization's knowledge assets can be understood, managed, and evaluated. (2 cr)

### **MOT 8224: Pivotal Technologies**

Focus on selected technologies expected to play key roles in future industrial development. Current state-of-the-art status for each technology and the commercialization barriers and opportunities. Discussions by guest experts and student group analyses of potential applications of the technologies to industry. (2 cr)

### **MOT 8231: Managing Information Resources in Technology-based Organizations**

Managing information resources and technology in an organization where technology is a critical part of the value chain. Database management systems and electronic

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## **MOT Courses** continued

commerce. Discussion of managerial issues, including IT/IS strategic planning, infrastructure, outsourcing, competitive value, and implementation. (1 cr)

### **MOT 8232: Managing Technological Innovation**

Focus on innovation and the management of innovation as primary drivers of business strategy and success. Topics include patterns of innovation development and enhancement of an innovation environment. Bringing innovation from a concept to the marketplace in existing businesses and new ventures. (2 cr)

### **MOT 8233: Strategic Management of Technology**

Formulating managerial strategies for technology and technology-intensive businesses. Industry dynamics; competitive challenges for improving corporate performance and leveraging technological competence. (2 cr)

### **MOT 8234: MOT Capstone Project**

Students work with a faculty adviser, in cooperation with their home organization and a work mentor, to complete an applied research activity. The concepts and methods learned in the MOT program are used to develop an industry-based project that focuses on: Technology forecasting or analysis; a new or improved technology product or process; a new revenue stream or business venture; project management; a general business challenge or opportunity. The project includes issue scoping, analysis, development of options, recommendations, and implementation approaches. A formal presentation to the capstone faculty committee is required. As needed, faculty sign non-disclosure agreements. (2 cr)

### **MOT 8900: Conflict Management**

Theory and methods for applying conflict management techniques in organizations. Cooperative and competitive models of conflict, basics of bargaining, conflict strategies, communication styles, listening skills, dispute resolution, third-party mediation, and other tools for conflict mediation. (0.5 cr)

### **MOT 8910: Corporate Responsibility**

Principles of stakeholder management. Ethical framework for responsible management of investors, employees, suppliers, customers, and the external community. Moral leadership, trust in organizations, quality control, and techniques for socially-responsible organizational management. (1 cr)

### **MOT 8920: Science and Technology Policy**

Examines the role of government and the influence of companies and individuals related to science and technology policy. Identifies and evaluates current and proposed, national and international, technology-related public policy. (1.5 cr)

### **MOT 8940: Managing Intellectual Property**

Managing technology by protecting intellectual property rights. Analysis of various intellectual property areas – patents, copyrights, trade secrets – and the protection afforded by each. Selection of the proper protection for different technologies; licensing of intellectual property; infringement prevention; alternative remedies if infringement occurs. (variable credits: 0.5 - 1.5 cr)

### **MOT 8950: International Management of Technology Project**

On-site residency in international locations for up to two weeks. Includes visits to technology-intensive local and U.S.-based companies; also lectures and discussions with company executives, government officials, and university faculty. Comparative analysis of management of technology concepts and issues in an international business context, including social, economic, cultural, and governmental perspectives. (1.5 cr)

### **Seminar: Managing Stress and Balancing Work/Life**

Balancing the demands of work, home, and school with practical tools around applying time management, organizational and stress management skills. (0 cr)

### **Seminar: MOT Leadership Effectiveness**

In six modules over four semesters, students learn to lead effective innovation teams and organizations. First-year: Principles and practices to enhance team effectiveness and collaboration; insights will be used immediately in MOT work groups and in professional roles. Second-year: Review personal leadership attributes and behaviors that distinguish highly effective leaders of innovative organizations; principles and practices will help students anticipate and address the implementation and change management challenges inherent in industry and in the development of their capstone projects. (0 cr)

## MOT Faculty

The Master of Science in the Management of Technology (MOT) is an interdisciplinary program that brings together world-class faculty from the University of Minnesota's College of Science and Engineering, Curtis L. Carlson School of Management, the Law School, and the Hubert H. Humphrey Institute of Public Affairs. MOT faculty are senior graduate and endowed chair faculty and have extensive research, teaching, and corporate experience. Faculty from other academic institutions or experts from the corporate community and government also teach or assist as needed.

### Massoud Amin

*Honeywell/Harold W. Sweatt Chair and Director, Technological Leadership Institute; Professor, Electrical and Computer Engineering, University Distinguished Teaching Professor; Director of Graduate Studies, Master of Science in Security Technologies, College of Science and Engineering, University of Minnesota*

**Education:** B.S. and M.S., electrical and computer engineering, University of Massachusetts-Amherst; M.S. and D.Sc., systems science and mathematics, Washington University in St. Louis.

**Research:** Global transition dynamics to enhance resilience, security, and efficiency of national critical infrastructures, including energy, communications, transportation, and economic networks; theory and application of self-healing controls including reconfigurable and self-repairing designs, system optimization, and differential game theory for aerospace, energy, and transportation applications.

**Consulting/Corporate Experience:** Electric Power Research Institute (EPRI), McDonnell Douglas, Boeing, NASA-Ames Research Center, Rockwell Int'l, MEMC Electronic Materials Inc., Electronics & Space Corp., TSI, U.S. Dept. of Defense, U.S. Air Force, U.S. Army Research Office, U.S. Dept. of Energy, National Science Foundation, National Governors' Assoc., White House Office of Science and Technology Policy, U.S. Congress, U.S. National Academy of Engineering, U.S. National Academy of Sciences. Led national, post-9/11 utilities' infrastructure security R&D.

**Web site:** <<http://umn.edu/~amin>>

### Charles Caliendo

*Senior Lecturer, Accounting Department, Carlson School of Management, University of Minnesota*

**Education:** B.S., Brooklyn College, City University of New York; J.D., University of Richmond School of Law; M.B.A., University of Minnesota.

**Expertise:** Managerial accounting techniques for U.S.-based companies involved with businesses in highly inflationary countries.

**Consulting/Corporate Experience:** America Online; McGuire, Woods, Battle & Booth Law Firm; Motorola; Cargill; Carlson Companies; Kurt Salmon Associates Consulting; Merrill Lynch; Oak Ridge National Laboratory.

### Lockwood Carlson

*Honeywell/James J. Renier Chair and Senior Fellow, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; President, Lockwood Carlson Consulting LLC*

**Education:** B.S., physics, Hamline University; Ph.D., theoretical physics, University of Wyoming

**Consulting/Corporate Experience:** New business and product development consulting; 39 years of work experience with 3M Company, most recently in Corporate Enterprise Development.

**Expertise:** Technology opportunities evaluation, development, and strategies for small and large business enterprises; business evaluation and commercialization of new products in information technology, electronics, communications, software, and advanced materials; technology advancement, business development, intellectual property and start-up business processes.

### Kenneth R. (Beau) Farmer II

*Faculty, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; Chief Technology Officer, TSI Inc.*

**Education:** B.S., engineering science, University of Virginia; M.S. and Ph.D., applied physics, Cornell University.

**Research and Corporate Expertise:** Silicon microfabrication, micromachining and wafer bonding; physics in metal-insulator-semiconductor device structures; microelectromechanical systems; aerosol science; fluid mechanics.

**Corporate Expertise:** Technology foresight; corporate-level technological leadership and organizational development; business alliance and acquisition; new product and business development.

**Academic/Corporate Experience:** New Jersey Institute of Technology; Rutgers University; Columbia University; NJIT Microelectronics/Microsystems Research Center; NJ MEMS Initiative; TSI Inc.

### Thomas Fiutak

*Senior Fellow, Technological Leadership Institute, College of Science and Engineering; Lecturer, College of Education and Human Development, University of Minnesota*

**Education:** M.S., college student personnel services, and Ed.D., higher education and organizational behavior, Indiana University.

**Research:** Conflict management theory; negotiation; conflict cultures, especially in academe; the role perceived culture plays on adapting models of mediation.

**MOT Faculty** continued**Thomas Fiutak** (cont.)

**Consulting/Corporate Experience:** The World Bank; City of New York post-9/11 summit, “Listening to the City,” Lower Manhattan redevelopment; community service organizations, neighborhood mediations, and Minnesota’s farmer-lender mediation program. Mediator training in the U.S., Philippines, and Europe. Provided mediation consulting and training in Poland, the Czech Republic, Hungary, Bulgaria, Moldova, France, Egypt, Germany, Malta, Thailand, Tanzania, and India.

**Kirk Froggatt**

*Senior Fellow, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; Vice President, Talent Development, Ecolab*

**Education:** B.A., industrial/organizational psychology, San Diego State University; M.S., organizational behavior and management, Krannert Graduate School of Management, Purdue University.

**Research:** Enhancing capacity for innovation in many forms (e.g., technological, business process, and business model innovation), developing “ambidextrous” leaders who are capable of simultaneously exploiting mature businesses and exploring emerging growth opportunities, developing leaders and organizational culture to support execution of strategic intent.

**Consulting/Corporate Experience:** Agilent Technologies, Yahoo!, Silicon Graphics, Inc., Hewlett Packard, Purdue University Discovery Park Center for Entrepreneurship.

**Edward Joyce**

*Associate Dean; Professor, Accounting, Carlson School of Management, University of Minnesota*

**Education:** B.S., B.A., accounting, Ohio State University; M.A.S. and Ph.D., University of Illinois

**Research:** Human judgment and decision making in business contests, acquisition of expertise in auditing, efficacy of outcome-based versus behavior-based accounting control systems in programmable and non-programmable task environments.

**Consulting/Corporate Experience:** General Motors, Rockwell International and the public accounting firm of Ernst & Young. Developing and teaching executive seminars in managerial finance and accounting.

**Carl Kime**

*Faculty, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; President, Lodestar Strategies*

**Education:** B.S., commerce and M.Ed., education philosophy, University of Virginia.

**Additional studies:** Georgetown University Government Affairs Institute; Defense Acquisition University; Command and Staff College (honors graduate); Amphibious Warfare School (honors graduate); Marine Corps Basic School (honors graduate); Officer Candidate School (honors graduate).

**Expertise:** Defense, intelligence and homeland security policy and program analysis; science and technology policy; defense and special operations acquisition; personnel management and organizational leadership; and information technologies.

**Professional Experience:** Defense Advanced Research Projects Agency; House Appropriations Committee; Joint Chiefs of Staff; Marine Corps.

**Kevin Linderman**

*Associate Professor, Operations and Management Sciences, Carlson School of Management, University of Minnesota*

**Education:** B.A., mathematics and philosophy, Minnesota State University; M.S., mathematics, Miami University; M.S., management science and Ph.D., operations operations management, Case Western Reserve University.

**Research:** Six Sigma and knowledge management, manufacturing planning and control systems, quality control and management, integrating process control and maintenance, economic design of control charts.

**Consulting/Corporate Experience:** Keystone, Schwan’s Food Service, MacMillian Bloedel, TBN, GEON, PCC Airfoils.

**Alfred Marcus**

*Honeywell/Edson W. Spencer Chair, Technological Leadership Institute, College of Science and Engineering; Professor, Strategic Management and Organization, Carlson School of Management, University of Minnesota*

**Education:** B.A. and M.A., University of Chicago; Ph.D., Harvard University.

**Research:** Business strategy, business and the natural environment, safety and quality, business regulation and deregulation, electric utilities and the energy industry, organizational learning and competence acquisition.

**Consulting/Corporate Experience:** Corning, IBM, 3M, national and local power companies including Xcel Energy.

**Wayne A. Pletcher**

*MOT Faculty, Technological Leadership Institute, College of Science and Engineering, University of Minnesota*

**Education:** B.S., chemistry, Ohio University; M.S. and Ph.D, chemistry, University of Michigan; postdoctoral appointments, chemistry, University of Michigan and Florida State University.

**MOT Faculty** continued**Wayne Pletcher** (cont.)

**Experience:** 30+ years of corporate experience in technical R&D management and executive business leadership. Recent positions include director of Corporate Technical and Business Planning at 3M and president and CEO of Minnesota Technology, Inc.

**Dennis Polla**

*Honeywell/William R. Sweatt Chair in Management of Technology, Director of Graduate Studies, Master of Science in Management of Technology, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; Deputy Office Director, Intelligence Advanced Research Projects Activity (IARPA)*

**Education:** S.B., electrical engineering and physics; S.M., electrical engineering and computer science, Massachusetts College of Science and Engineering; Ph.D., electrical engineering, and M.B.A., University of California, Berkeley.

**Research:** Development and integration of microsensors and microactuators with silicon VLSI technologies and compound semiconductors for sensing applications.

**Consulting/Corporate Experience:** General Electric, Honeywell, AT&T Bell Telephone Laboratories, Rosemount Aerospace, Medtronic, Applied Bio Systems, Alcon Surgical, Texas Instruments, DuPont, B. F. Goodrich, and Hughes Aircraft.

**Dileep Rao**

*Senior Lecturer, Strategic Management and Organization, Carlson School of Management, University of Minnesota; President, Interfinance Corporation*

**Education:** B.E., mechanical engineering, University of Bombay; M.S., industrial engineering; Ph.D., business administration, University of Minnesota-Twin Cities.

**Expertise:** Entrepreneurship, opportunity, venture development and venture capital for corporate and area growth.

**Consulting/Corporate Experience:** COO, president, board member and chair for companies such as InterFinance Corp., Midwest Development Bank, and Krebsbach Enterprises.

**Frederick Riggins**

*Senior Fellow, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; Associate Professor, Department of Information Systems, Arizona State University*

**Education:** B.S., physics and M.B.A., University of Iowa; M.S. and Ph.D., information systems, Carnegie Mellon University.

**Research:** Business models for internet-based commerce; e-business strategies; management strategies for implementing inter-organizational systems; measuring the diffusion, usage, and value of electronic data interchange; customer perceptions of the value of online shopping and financial services.

**Consulting/Corporate Experience:** Home Depot, Bank of America, Chrysler, Boeing, H. B. Fuller. Conducts executive education programs for companies in the Twin Cities.

**Karl Smith**

*Cooperative Learning Professor of Engineering Education, Department of Engineering Education, Purdue University; Morse-Alumni Distinguished Teaching Professor, Civil Engineering, College of Science and Engineering, University of Minnesota*

**Education:** B.S. and M.S., metallurgical engineering, Michigan Technological University; Ph.D., educational psychology, University of Minnesota.

**Research:** Problem formulation, modeling, and knowledge engineering; civil engineering systems; and project and knowledge management and leadership.

**Consulting/Corporate Experience:** Lakehead Pipeline, SuperValu, and Northwest Airlines.

**Tarun Soni**

*MOT Faculty, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; Business Area Director, Argon ST (San Diego, CA)*

**Education:** B.Tech., electrical engineering, Indian College of Science and Engineering, Bombay, India; M.S., electrical and computer engineering, M.A., mathematics, and Ph.D., electrical and computer engineering, University of California at San Diego; EMBA, University of California at Los Angeles.

**Expertise:** Technology strategy and development, technology and R&D management, innovation, entrepreneurship, organizational development, venture and talent development, marketing strategies for high-tech companies, mergers and acquisitions, computing, networking, systems and software.

**Consulting/Corporate Experience:** NASA, Torrey Communications Corp., WaveWare Communications Inc., SBS Technologies, consulting for mergers and acquisitions and technology strategy and development.

**Theresa Surprenant**

*Gemini Chair and Senior Fellow, Technological Leadership Institute, College of Science and Engineering, University of Minnesota*

**Education:** B.S., technical communication and M.S., management of technology, University of Minnesota.

## *MOT Faculty* continued

### **Theresa Surprenant** (cont.)

**Research:** University technology transfer; technology product and program management; history of technology commercialization; leadership development; organizational effectiveness.

**Consulting/Corporate Experience:** Product and program management: BASF, Armstrong World Industries, HNC Software (currently FICO), Coloplast Corp, University of Minnesota - Carlson School of Management.

### **Stephen Wilbers**

*Senior Fellow, Technological Leadership Institute, College of Science and Engineering, University of Minnesota; Business Writing Consultant; Syndicated Columnist*

**Education:** B.A., Vanderbilt University; M.A. and Ph.D., University of Iowa.

**Experience:** Writing consultant, author, syndicated columnist.

**Research:** On-the-job writing.

**Consulting/Corporate Experience:** Has provided training seminars in effective writing to more than 6,500 technical, academic, and business and legal writers.

**Web site:** [www.wilbers.com](http://www.wilbers.com)

**Please note:** *Courses and instructors may be subject to change without notice.*

## Admission Requirements & Application Deadline

### Fall 2012

The MOT is an intensive graduate program designed for experienced engineers and scientists who have achieved springboard positions in their organizations and have demonstrated a potential for technological leadership.

#### Admission Requirements

- an undergraduate (or 4-year-baccalaureate-equivalent) degree
- at least five years of full-time work experience in a science, engineering, or technology-related area
- demonstrated managerial/leadership experience or potential
- on rare occasions, applicants with three or more years of work experience who demonstrate accelerated leadership ability have been admitted to the MOT program
- FFI: See the “Frequently Asked Questions,” on page 4

#### Admission Recommendations

- an overall GPA of 3.00 or higher (on a 4-point scale)
- corporate endorsement
- admitted students’ qualifications often exceed the prerequisites; **early application is encouraged**

#### GRE/GMAT Information

- Because of the rigorous selection process and the high motivational level and extensive work experience of MOT applicants, it is rare that applicants be required to submit Graduate Record Exam (GRE) or Graduate Management Admission Test (GMAT) scores. However, at their discretion, the MOT Director of Graduate Studies or the University of Minnesota Graduate School may require GRE or GMAT scores.

#### Application Review and Deadline

The MOT applications will be available and the MOT admission committee will review fall 2012 applications starting November 1, 2012.

The MOT admits for fall semester only. The application deadlines (in reverse chronological order) are as follows:

- 1) U.S. citizens/permanent residents/international applicants in the U.S. with a work visa: June 15, 2012:
  - Late applications are reviewed through mid-August on a case-by-case basis. Please contact us for more information.

- 2) International applicants (not in the U.S. with a work visa): May 1, 2012:

- Because of visa processing, the international applicant deadline cannot be extended.

Application decisions are made on an on-going basis: Once all application materials are received, qualified applicants attend an admission interview; a decision is usually made within one week after the interview.

#### Information Sessions

To make an informed decision about financing the program or whether or not it is right for you, you’ll find the information session invaluable. That’s why we made attending one an application requirement. To see this year’s information session schedule, go to [tli.umn.edu](http://tli.umn.edu) and select “Info Sessions.”

If you are unable to attend a scheduled information session, please contact Amy at the TLI office (see below) so that she can make alternate arrangements with you.

#### Contact Information & General Application Information

- **Before you start your MOT application**, contact Ms. Amy Danzeisen at [mot@umn.edu](mailto:mot@umn.edu) or 612.624.8826 to receive application instructions and to inform us of your intention to apply.
- If you have ever attended a class as an admitted University of Minnesota Graduate School student, please contact TLI for a “re-admission/change of status” application checklist.
- All Minnesota applicants must attend an in-house MOT information session. For further information: go to [tli.umn.edu](http://tli.umn.edu) and choose “Info Sessions.”

## Fees & Financial Aid

Fall 2012

### Fees

The MOT program cost is comprehensive and remains the same for two consecutive years. In academic year 2011, the comprehensive cost was \$70,500 or \$17,625 per semester (payments are per semester). The comprehensive 2012-2014 cost will be available by April 2012. Included in the comprehensive MOT program cost is:

- tuition and fees\*
- International MOT Project class\*
- textbooks and course packets
- class-day food, beverages, and parking

Since we publish the entire program cost, the MOT may look more expensive than other programs, but the price includes significant built in value (e.g., the Capstone Project class) and is very competitive with the U of M's part-time and executive MBA programs. FFI: Please see "Frequently Asked Questions."

The next step is to contact us to RSVP for an upcoming informational session that will provide further information about MOT program costs, expected return on investment, program cost comparisons, and additional financing options for the MOT program.

### Contact Information

For further questions and assistance, please call Amy at 612.624.8826.

*\*There are no additional special fees outside of the MOT comprehensive cost. The comprehensive cost includes round-trip airfare, lodging, and some meals for the two-week International MOT Project class. Costs incurred outside of the class itinerary are not included, e.g., students who extend their stay for personal or business reasons. MOT students have access to University facilities such as the libraries, bookstores, and cultural centers. However, access to some University services (e.g., the recreational center) requires the payment of additional fees.*

### Financial Aid

MOT tuition is an investment in your career and your earning potential; nonetheless, it is a significant expenditure. Most students receive full or partial tuition expenses from their employers. Please note: The MOT program spans three educational benefit fiscal years.

There are a variety of other sources for assistance, and

the MOT information session provides further information about funding sources and ways to finance your MOT degree (refer to "Admission Requirements" page and "Information Sessions").

Most company educational benefits are based on funding a part-time program, and the average fiscal year benefits do not take into account accelerated programs such as the MOT or executive MBA programs. Therefore, we regularly work with applicants on funding their MOT education.

### Federal Financial Aid for Citizens and Permanent Residents

MOT students who are U.S. citizens or permanent residents qualify for a variety of income-based and non-income-based loans. Because of the per-semester credit load, MOT students have full-time status and will not be assessed loan re-payments until after the completion of the program. The majority of students receive generous company support to attend the program; contact our office for further information, and for ideas on how to finance your MOT education.

### Income-based Financial Aid for Citizens and Legal Residents

There is limited income (i.e., need)-based tuition assistance for MOT students who are U.S. citizens or legal residents. Awards are competitive and amounts are from \$1,000 - \$5,000 per year. Contact our office for further information.

### Research or Teaching Assistantships

The MOT program does not offer research or teaching assistantships.

### Financial Aid Available for Non Citizens/Residents

The MOT program does not offer financial aid for applicants who are not legal residents or U.S. citizens. Please contact the following office for further information:

International Student and Scholar Services  
190 Humphrey Center  
301 19th Avenue South  
Minneapolis MN 55455 USA  
612.626.7100  
[www.iss.umn.edu](http://www.iss.umn.edu)

## MOT Case Studies

### Katrina Williams Hale

**Current Job:** Manufacturing Product Manager, 3M Co.

**Her Career:** Hale started the program while she was a Six Sigma. The program allows you to “complete the transition from engineer or scientist to a manager with technical knowledge who knows how to operate as a business person.”

**Helpful Services:** As an executive-formatted program, the MOT makes the logistics of attending school as hassle-free as possible. “They make working as well as going to school a whole lot easier.”

**In the End:** “The program made me a more well-rounded manager by giving me different perspectives and experiences.”

### Drew Flaada

**Current Job:** Director of Emerging Solutions Development, IBM Corp.

**The Right Place:** “I walked into the program looking for tools to add to the toolbox. The MOT gave me what I was looking for. It gave me a much better understanding of how decisions are made and why and how you make those decisions.”

**Learn From the Best:** The MOT program features faculty members who understand theory and practice. “The quality of the instruction is exceptional. The faculty members are second to none.”

**Impact Since Earning His MOT Degree:** Flaada has assumed greater responsibilities and moved into senior executive roles.

### Michael Rancour

**Current Job:** Senior Director, Test Engineering, Seagate Technology

**Why MOT?** “I was thinking about how I could differentiate myself to advance within the company.”

**After the Degree:** Since entering the program, Rancour has received three promotions. “I think the MOT made a significant difference in my career.”

**Convenient Format:** Students enter the program as a cohort class and complete the degree together in two years. “I really liked the lock-step aspect of it; it’s work but in two years you are done.”

**Overall:** “It was stimulating. The knowledge that I gained has helped me to stand out within the organization.”

### Jon Carlson

**Current Job:** CEO, Braun Intertec Corp.

**His Story:** After entering the MOT program, he helped restructure his company; he became a principal in the firm and is now vice president of operations.

**Applications:** “The program helped me further develop my strengths and showed me how to develop new tools. That development made me better able to address the business challenges faced by my company and our industry.”

**Booster:** “The MOT program definitely helped my career.”

### Pamela Greve

**Current Job:** Vice President, Information Technology, Ingersoll Rand

**The Start:** While working at Alliant Techsystems, then a part of Honeywell, her manager recommended her for the program.

**Since Then:** Her MOT education has been an asset as she moved into positions of greater responsibility, including divisional chief information officer at Deluxe Check and vice president and chief information officer for Ecolab.

**Connections:** “The MOT gave me the perspective, relationships, and skills to make significant career steps.”

### Jon Wood

**Current Job:** Director of Strategic Development, U.S. Marketing, Coloplast

**Changes:** “I knew there was tremendous opportunity awaiting in medical device, but I didn’t have the experience nor the credibility to make the leap. As an MOT alumnus I have renewed confidence in my career and feel I am moving in the right direction. The MOT provided relevance and credibility to a career that had stalled.”

**New opportunities:** Several months into the program, Jon pursued a new career opportunity. “Immediately, *everything* I was learning in MOT had relevance. My MOT activities and projects added to my credibility within my new organization. Our senior vice president began to place me on special projects, many of which have me presenting to the executive leadership team.”

**New career trajectory:** “My capstone was analyzed at the highest levels. As a result, I was recognized as a critical thinker with valuable strategic insight. My career has a new trajectory: Strategy.”

## ***TLI and University of Minnesota Statements: Mission and Commitment to Diversity***

### ***The Institute's Background and Mission***

The Technological Leadership Institute (TLI) – formerly the Center for the Development of Technological Leadership – was established as an interdisciplinary center via an endowment from the Honeywell Foundation to the University of Minnesota in 1987. The endowment purpose was to develop the leadership abilities of fast-tracked science, engineering or other technology-based working professionals at all corporate levels. The institute's expertise is in technological leadership and management at the interface of business, strategy, science, technology, innovation, and policy. TLI is housed in the University's College of Science and Engineering.

Interdisciplinary cooperation is critical in delivering institute programs. In addition to five endowed chair positions, TLI faculty are selected from industry, government and the University of Minnesota – bridging among the College of Science and Engineering, Carlson School of Management, College of Education and Human Development, Hubert H. Humphrey Institute of Public Affairs, and the Law School.

**TLI's mission** is to develop world-class leaders and to empower executives and leaders in their strategic vision to leverage technology to drive business development and maximize growth.

#### **TLI's Educational Programs**

- Master's degrees for working professionals:
  - M.S. in Infrastructure Systems (civil) Engineering
  - M.S. in Management of Technology
  - M.S. in Security Technologies
- Ph.D. and M.S. minors in Security Technologies
- Customized continuing education opportunities in technological leadership and management for industry, government agencies, and individuals; collaborative U.S. and international college programs; free and fee-based seminars and colloquia on technology foresight and forecasting, innovation, and strategic management and leadership for technology-based individuals and organizations.

**For More Information:** To learn more about programs offered by TLI, please contact us at 612.624.5747 or visit our web site at <tlj.umn.edu>.

### ***University of Minnesota***

**Philosophy:** The University of Minnesota is founded in the belief that all people are enriched by understanding, is dedicated to the advancement of learning and the search for truth; to sharing of this knowledge through education for a diverse community; and to the application of this knowledge to benefit the people of the state, the nation, and the world.

### ***Graduate School Mission***

The Graduate School's mission is to make the advanced teaching and research of the University as effective as possible by providing efficient and innovative central services; promulgating best practices in graduate education; providing competitive support to the best faculty and students; providing support for the most promising interdisciplinary research; and working with the Provost to support college and intercollegiate programs.

### ***Graduate School Commitment to Diversity***

The Graduate School embraces the University of Minnesota's position that promoting and supporting diversity among the student body is central to the academic mission of the University. A diverse student body enriches graduate education by providing a multiplicity of views and perspectives that enhance research, teaching, and the development of new knowledge. A diverse mix of students promotes respect for, and opportunities to learn from, others with the broad range of backgrounds and experiences that constitute modern society. Higher education trains the next generation of leaders of academia and society in general, and such opportunities for leadership should be accessible to all members of society. The Graduate School and its constituent graduate programs are therefore committed to providing equal access to educational opportunities through recruitment, admission, and support programs that promote diversity, foster successful academic experiences, and cultivate the leaders of the next generation.