Proposal for an Interdisciplinary Graduate Certificate: The International Profile Certificate

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Geological Engineering & Sciences
Blair Orr
Forestry and Environmental Sciences
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Civil and Environmental Engineering
John Gierke
Geological Engineering & Sciences
Andrew Storer
Forestry and Environmental Sciences

1. General Description
This proposal recommends the establishment of a Graduate Certificate called the International Profile. This non-departmental certificate would be available to all degree-seeking as well as nondegree-seeking students enrolled in the Graduate School at Michigan Technological University.

Title of Certificate: International Profile Certificate

Catalog Description
The International Profile Certificate recognizes advanced study of any field, but with a substantial international perspective that demonstrates an ability to bridge cultural and language barriers and collaborate effectively.

2. Rationale
Professional work in most fields demands work with diverse groups of people in a wide variety of physical and cultural environments. Educational programs could be expected to include exposure and demonstrated success in working all over the world, and in dealing with all aspects of work on a global basis, because it has a direct link to productivity in workplaces. The degree offerings of a university should reflect accurately the training of students in international contexts.

Michigan Tech has strong and growing international programs. Important examples of these are the Peace Corps associated Masters International Programs in six different academic departments (http://peacecorps.mtu.edu/). In these programs there is two years of volunteer duty in a foreign country and substantial language and cultural training. These programs have changed the focus of their home departments substantially, so that international work is developing even more rapidly than before. International exchange programs for graduate students, such as

EHaz: (http://www.geo.mtu.edu/EHaz/index.htm),
SustR: (http://www.geo.mtu.edu/%7Easmayer/sustr.htm)
have triggered significant international exchanges and multi-university course and degree programs. Both Forest Resources and Environmental Science and Geology have just proposed new joint graduate degree programs through EUAtlantis which will involve substantial mobility of MS students to Europe. The development of the Michigan Tech Chapter of Engineers Without Borders, the Aqua Terra Tech Enterprise and other international Senior Design efforts and the D80 Center are grass roots developments that have affected many different graduate programs. We believe that the International Profile is a necessary and appropriate educational opportunity for postgraduate students that will offer them an attractive supplement to their graduate degrees in this era of rapid paced technological change and with a strong need for international bridging. In addition to language and cultural coursework, students will spend one or more semesters abroad doing research, internships and/or coursework.

The International Profile Certificate is designed to:

1. encourage students to pursue international research, internship and course opportunities;
2. deepen students' understanding of world cultures and global issues;
3. develop a world wide perspective on science, engineering and social issues, such as global change and natural hazards;
4. encourage a basic proficiency in another language; and
5. enhance intercultural communication skills.

3. Related Programs

Undergraduate minors such as “Study Abroad Minors” or “International Minors” exist at many universities (see University of Minnesota, Auburn). A 12 credit Ph D Minor exists in Global studies at the University of Indiana, and we expect that many such examples are now developing on other campuses. At Michigan Tech graduate minors do not exist, so a certificate seems the best current option.

4. Projected Enrollment

Based on likely faculty participants and current graduate enrollments, we estimate that approximately 20 students may be enrolled at any time. In time we anticipate that this program would become available to students via Distance Learning.

5. Scheduling Plans

This graduate certificate program is primarily a regular (daytime) program.
6. Curriculum Design

A total of 12 credits are required for an International Profile. Students must earn a grade of B or higher in each course to be applied toward the certificate. As an interdisciplinary certificate, a maximum of 6 credits is allowed in courses at the 3000- and 4000- levels.

(A) Foreign Language Requirement
A knowledge equivalent to two years of college coursework in a foreign language is a prerequisite. The student can demonstrate this either by taking such courses at Michigan Tech or another university, by scoring at the third year level or higher on the modern language test administered by the Humanities Department for Spanish, French or German, or by similar scores on modern language tests in other languages.

(B) International and Intercultural Awareness (3 credits minimum)
BA4710
BA4780
CE5993
CE5990, 5991, 5992
EC3100
FW5770
FW5720
GE5001
HU3253
HU3261
HU3262
HU3263
HU3264
HU3502
HU3545
HU3850
HU5050
PSY3070
SS3100
SS3410
SS3610
SS3620
SS3940
SS4210
UN4000
UN5990

(C) Required International Experience (6 credits) Students must have a minimum of six credits of coursework taken in a foreign country while concurrently enrolled as an Michigan Tech graduate student.

(D) Integrated International Studies
UN 5555 Integrated International Studies Seminar (1 credit)
UN 5555 will be proposed as a new course.

**UN5555 Integrated International Studies Seminar** (1 credit, fall, spring). Prerequisite: graduate standing, instructor approval, and a minimum of one semester of graduate study in a foreign country. Seminar discusses the cultural differences of implementing research in a foreign country. Case studies and history of universities in other countries are included.

For convenience, relevant course descriptions are given below:

**BA 4710 - International Management**
Study of managing work in a global context. Assesses impact of culture and the international environment (economic, social, legal, technological) on management, personnel, marketing, accounting, and finance strategies. Examines international business structures from licensing to joint ventures. Develops attitudes and skills leading to increased international effectiveness.

<table>
<thead>
<tr>
<th>Credits:</th>
<th>3.0</th>
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<tbody>
<tr>
<td>Lec-Rec-Lab:</td>
<td>(0-3-0)</td>
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<tr>
<td>Semesters Offered:</td>
<td>On Demand</td>
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<tr>
<td>Restrictions:</td>
<td>May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior</td>
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<td>Pre-Requisite(s):</td>
<td>BA 3700 and EC 3100(C)</td>
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**BA 4780 - International Business Communications**
Studies the importance of intercultural communication competence for effective business relationships. Provides a theoretical and practical foundation for successful business communication by examining the communication processes and contextual units.

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<td>Pre-Requisite(s):</td>
<td>UN 1001 and (UN 1002 or UN 1003) and UN 2001 and UN 2002</td>
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**CE 5990 - Civil Engineering Graduate Seminar**
Detailed study and group discussions of current literature and graduate research projects related to the broad field of civil engineering. Topics will be combined to address the student's area of interest, including construction, environmental, geotechnical, structures, transportation, and water resources. External speakers discuss current related issues.

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<th>Credits:</th>
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<td>Lec-Rec-Lab:</td>
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<tr>
<td>Semesters Offered:</td>
<td>Fall, Spring</td>
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<td>Restrictions:</td>
<td>Must be enrolled in one of the following Level(s): Graduate</td>
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**CE 5991 - Environmental Engineering Graduate Seminar I**
Presentations and discussion of current literature and research related to the broad field of environmental engineering.

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<td>Lec-Rec-Lab:</td>
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<tr>
<td>Semesters Offered:</td>
<td>Fall</td>
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**CE 5992 - Environmental Engineering Graduate Seminar II**
Presentations and discussion of current literature and research related to the broad field of environmental engineering.

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<td>Lec-Rec-Lab:</td>
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<tr>
<td>Semesters Offered:</td>
<td>Spring</td>
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CE 5993 - Field Engineering in the Developing World
Study of applying appropriate and sustainable engineering solutions and technology in the developing world. Concepts of sustainable development are covered. Topics are drawn from several areas of engineering, including water supply/treatment, wastewater treatment, materials, solid waste, construction, and watersheds.
Credits: 2.0
Lec-Rec-Lab: (0-1-2)
Semesters Offered: Spring
Restrictions: Must be enrolled in one of the following Level(s): Graduate

EC 3100 - International Economics
Introduction to international economics, including balance of payments, accounting, foreign exchange markets, international trade theory, barriers to trade, trade and development, regional economic integration, and current U.S. international economic issues.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Spring, Summer
Pre-Requisite(s): EC 3001 or (EC 2002 and EC 2003) and UN 2002

FW 5720 - International Forestry Seminar
Seminar for students who have completed FW5730. Synthesizes field work in a theoretical framework. Covers macro aspects of development theory.
Credits: 1.0
Lec-Rec-Lab: (0-1-0)
Semesters Offered: Fall, Spring, Summer
Restrictions: Must be enrolled in one of the following Level(s): Graduate
Pre-Requisite(s): FW 5730

FW 5770 - Rural Community Development Planning and Analysis
Context, analysis, and monitoring of development processes of rural communities in tropical countries.
Credits: 2.0
Lec-Rec-Lab: (2-0-0)
Semesters Offered: Spring
Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore, Junior

GE 5001 - Intercultural Natural Hazards Communication in Latin America
Credits: 2.0
Lec-Rec-Lab: (0-2-0)
Semesters Offered: Fall
Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore

HU 3261 - Communicating Across Cultures
Comparative study of interpersonal communication across cultures by both foreign and American students, with emphasis on cultural patterns, attitudes, values, and nonverbal behaviors. Instructor selects cultures for study from Third World, Western, or non-Western regions.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003
HU 3262 - Topics in Francophone Cultures
An introduction to Francophone cultures (in English) in a comparative perspective. Includes a survey of French history and its influence on modern-day French and Francophone societies through movies, media, and recent technologies, and a critical examination of cross-cultural differences between French and American cultures.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003

HU 3263 - Topics in German-Speaking Cultures
An introduction to German-speaking culture (in English) in a comparative perspective. Includes a survey of Central-European history and its influence on modern-day German-speaking societies through movies, media, and recent technologies, and a critical examination of cross-cultural differences between German and North-American cultures.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003

HU 3264 - Topics in Spanish-Speaking Cultures
An introduction to Spanish-speaking culture (in English) in a comparative historical perspective. Includes a survey and a critical cross-cultural examination of Latin-American culture and Spanish-speaking societies (European, Caribbean, and North, Central and South American) through literature, music, film, art and other media. Spanish-speaking cultures and North American society.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: Spring
Restrictions: May not be enrolled in one of the following Class(es): Freshman
Pre-Requisite(s): UN 1002 or UN 1003

HU 3502 - World Mythologies
Survey of the major mythological systems of the world with particular attention to those areas of commonality between the various civilizations. Films may provide contextual background.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: Spring - Offered alternate years beginning with the 2001-2002 academic year
Pre-Requisite(s): UN 1002 or UN 1003

HU 3545 - Literature Across Borders
Study of literary genres, themes, and movements, with emphasis on comparing and contrasting perspectives reflected in literatures from Western and non-Western cultures. Topics may focus on historical, social, aesthetic, and cultural factors as they influence these literatures. Films may be used.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: Fall - Offered alternate years beginning with the 2004-2005 academic year
Pre-Requisite(s): UN 1002 or UN 1003

HU 3850 - Cultural Studies
Examines the way that culture communicates values, feelings, beliefs; structures differential relations of power and possibility; creates difference and hierarchy. Considers the struggles over meaning that open up possibilities for diversity and change.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: Spring
Pre-Requisite(s): UN 1002 or UN 1003

HU 5050 - Intercultural Communication
A critical examination of cross-language and cross-cultural equivalences and differences through the study of acculturation, values, traditions, role expectations, perceptions, stereotypes, and gender issues as well as other verbal and nonverbal problems and issues of communication. Emphasizes the dimensions of communication within a comparative cultural context.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
Semesters Offered: On Demand
Restrictions: Must be enrolled in one of the following Level(s): Graduate

PSY 3070 - Cross-Cultural Psychology
Introduces the student to cross cultural psychology and sociocultural theory as it is applied to psychology. Examines research on cultural specific and universal behaviors. Emphasizes the benefits and challenges of diversity in organizations and diversity skills that promote interpersonal and organizational success.
Credits: 3.0
Lec-Rec-Lab: (0-3-0)
7
Semesters Offered: On Demand
Pre-Requisite(s): PSY 2000 and (UN 1002 or UN 1003)

SS 3100 - Developing Societies
An overview of the developing world. Asks "What is development?" in ecological, human, and economic terms. Explores variation among developing societies and elements of internal differentiation, including cultures, regions, classes, and genders. Emphasizes active student exploration of strategies for change, including technology, business, and political transformations.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring - Offered alternate years beginning with the 2000-2001 academic year
Pre-Requisite(s): UN 1002 or UN 1003

SS 3410 - World Resources & Development
Examination of the human geography and resources of various world regions. Emphasizes factors affecting prospects for development, including population dynamics, natural resource endowment, social and cultural systems, and spatial structure of society. Case studies of individual countries supplement general concepts and theories.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Summer - Offered alternate years beginning with the 2001-2002 academic year
Pre-Requisite(s): UN 2002

SS 3610 - International Law
Explores the principles, content, and logic of public international law, the law of nations. Students brief cases, prepare longer briefs to defend a side in a moot case, and engage in a moot court.
Credits: 3.0
Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall, Spring - Offered alternate years beginning with the 2000-2001 academic year
Pre-Requisite(s): UN 2002

SS 3620 - International Environmental Technology Policy
Explores the relationship between markets and government policies in moving national economies and corporations toward "greener" technology choices. Topics may include industrial ecology, regulation, innovation, and pollution prevention. Course employs examples from U.S., Canada, EU, and Japan. When possible, students work on a real-life project for a client.
Credits: 3.0  
Lec-Rec-Lab: (3-0-0)  
Semesters Offered: Fall, Spring - Offered alternate years beginning with the 2001-2002 academic year  
Pre-Requisite(s): UN 2002  

SS 3940 - World Affairs  
The study of current issues and themes in world affairs and of significant world tension areas. Detailed examination of central issues in selected recent regional or international conflicts or high profile internal problems in selected countries.  
Credits: 3.0  
Lec-Rec-Lab: (3-0-0)  
Semesters Offered: On Demand  
Pre-Requisite(s): UN 2002  

SS 4210 - Global Change in Culture and Society Since 1400  
Explores the increasing interconnectedness of world cultures since 1400. The course examines the social, economic, and political changes that accompanied the rise of world capitalism from multiple theoretical perspectives. Themes include colonialism, agency, resistance, world-systems theory, and globalization.  
Credits: 3.0  
Lec-Rec-Lab: (3-0-0)  
Semesters Offered: Spring - Offered alternate years beginning with the 2007-2008 academic year  
Restrictions: May not be enrolled in one of the following Class(es): Freshman  
Pre-Requisite(s): UN 1002  

UN 4000 - Remote Sensing Seminar  
A seminal series that covers topical issues in remote sensing, ecosystem research, and global change. Required for all students with a minor in remote sensing.  
Credits: 1.0; Repeatable to a Max of 2  
Lec-Rec-Lab: (0-1-0)  
Semesters Offered: Fall, Spring  
Restrictions: May not be enrolled in one of the following Class(es): Freshman, Sophomore  

Library and other Learning Resources.  
No additional library or learning resources are required.  

6. Computing Access Fees  
No computing access fees are required beyond those normally incurred by enrolled graduate students.  

7. Faculty Resumes  
Key faculty for this graduate certificate program include the three proposers, whose short vitae are attached at the end of this proposal: Numerous additional faculty and staff that are important to this program are those associated with the language programs in Humanities department and those who teach classes listed under section 6B (above), especially in HU and SS. This initiative recognizes a strong commitment to international perspectives in all study areas and receives broad support across the Michigan Tech campus. As such the main impact of this certificate may make these international classes more visible to graduate students.
Description of available/needed equipment.

8. Program Costs
There are no additional direct costs associated with establishing this graduate certificate program at this time. Foreign language courses are already in high demand and overbooked. The sustainability of offering UN5555 in the longer term may depend upon additional resources.

9. Space
No additional space is required.

10. Policies Regulations and Rules
All policies, regulations and rules are described in Section 6 and follow University Senate policy for Graduate Certificates. The committee of Peace Corps Masters International programs (including all of the proposers) will assist the Graduate School in the administration of this certificate. The committee may designate appropriate classes to qualify for the certificate in addition to those listed in this proposal. Recommendations for modification of the curricular requirements of this certificate shall be made through the to the Dean of the Graduate School.

11. Accreditation (Not applicable)

12. Internal Status of the Proposal

13. Planned Implementation
This program could begin starting in fall semester, 2009.

Vitae of organizers follows
WILLIAM I ROSE  
Professor, Department of Geological Engineering and Sciences  
Michigan Technological University  
HOUGHTON, MI 49931 USA  
906 487 2367; raman@mtu.edu  
www.geo.mtu.edu/~raman

PROFESSIONAL PREPARATION:  
Ph.D. in Geology, Dartmouth College, 1970;  
A.B. in Geography, Geology, Dartmouth College, 1966.

APPOINTMENTS:  
9/79-present: Professor of Petrology, Michigan Technological University, Houghton.  
6/90- 6/98 Department Chair, (planned new building; hired 8 new faculty); 9/74-9/79: Associate Professor of Petrology, 9/70-9/74; Assistant Professor of Petrology.  
1/99-12/99: Visiting Leverhulme Fellow, Dept of Earth Sciences, University Of Bristol, UK.  
8/85-6/86: Visiting Scientist, Los Alamos National Laboratory.  
1/81-present: Geochemist (W.A.E. basis), USGS, Cascade Volcano Observatory, Vancouver, WA; Alaska Volcano Observatory, Anchorage; VDAP.  
8/77-8/78: Senior Visiting Scientist, Upper Atmosphere Group, National Center for Atmospheric Research, Boulder, CO.  
8/77-8/78: Visiting Scientist, Branch of Isotope Geology, USGS, Denver, CO.

RELATED PUBLICATIONS


SYNERGISTIC ACTIVITIES


2. Since 1980: Educational efforts shared with many other campuses: Video based educational efforts in Optical Mineralogy, 1982; Volcanic Rock Textures, 1985; and video field trips: 1987-1993; Volcanic Rocks and their vent areas, Industry Short Courses (field trips and lectures); 1976-1985; Graduate Student field trip efforts, 1997 (Western Mexico and IAVCEI meeting); NSF funded International Travel Grant to IAVCEI Bali meeting, and associated Hawaii and Pinatubo field trips, July 2000; NSF Int Travel Grant for students to attend IAVCEI meeting in Chile, 2004. Special session exploring graduate volcanology educational efforts, AGU 2002. 2005-2009: FIPSE-NAFTA 6 University Consortium in Earth Hazards (EHaz), funded by Dept of Education.


4. Since 1992: Development of Michigan Tech Remote Sensing Institute. Co-organizer and Interim Director of an institute with 35 faculty members from nine different MTU departments, Development of shared lab facilities, success with equipment funding as a NASA center of excellence, development of an interdisciplinary minor program in remote sensing; many interdisciplinary seminar series and several new interdisciplinary classes.


RECENT COLLABORATORS EXTERNAL TO MICHIGAN TECH (2000-2005)
Stephen Self (Open University); Andrew Harris (University of Hawaii); Luke Flynn (University of Hawaii); Hans Graf (Cambridge Univ); Fred Prata (CSIRO, Australia); Arlin Krueger (UMBC); Vincent Realmuto (NASA/JPL); Frank Marzano (University “La Sapienza” of Rome); Costanza Bonadonna (Univ So Florida); Christiane Textor (Max Planck Inst Meteorology); Alain Bernard (University of Bruxelles);

THESIS ADVISEES AND POSTDOCTORAL SCHOLARS SPONSORED, LAST 5 YEARS
Tianxu Yu, STC/NOAA Washington, DC
Song Guo, Canadian Centre for Remote Sensing, Montreal
Sebastien Darveelle, Los Alamos National Lab
Demetrio Escobar, Volcanologist, SNET, El Salvador
Yingxin Gu, SAIC/USGS EROS Data Center, Sioux Falls, SD
I Matthew Watson, Bristol University UK
Matthew Patrick (current Post Doc) Owen P Mills, Adam Durant, Janelle Byman, Kelly Durst, John Lyons, Ellen Engberg, Hans Lechner, Adam Blankenbicker, Jemile Erdem, Karinne Knutsen, Ingrid Fedde (current graduate students)

**Graduate Students Supervised:** 39 M.S. and 14 Ph.D.

**Graduate Advisor:** Richard E Stoiber, Dartmouth College, deceased.
Professional Preparation


Appointments

2008 – present: Director of Peace Corps Programs. Michigan Technological University
2006 – present: Professor of Forestry, Michigan Technological University
1998 – 2006: Associate Professor of Forestry. Michigan Technological University
1992 – 2006: Assistant Professor of Forestry. Michigan Technological University
1988 – 1992: Assistant Professor of Forestry, The University of the South

Five Relevant Publications


Five Other Publications


Synergistic Activities

Peace Corps Master’s International Program
EU-US Atlantis Program
TIES – FIPSE and SustR programs in Mexico; Veracruz Study Abroad Program
World Forestry Committee of the Society of American Foresters
International Society of Tropical Foresters

Courses and Workshops:

Trees in Agricultural Systems; Overseas Research; Graduate Tropical Forestry; International Forestry Practicum; International Forestry Seminar; Community Planning and Analysis, Master’s Graduate Seminar; Doctoral Graduate Seminar

Collaborators and Affiliations

Dr. James B. Pickens, Michigan Technological University
Dr. Alex S. Mayer, Michigan Technological University
Dr. Willem Beets, retired
Dr. Karlyn Eckman, University of Minnesota
Dr. James Mihelcic, U. of South Florida
Dr. Kathleen Halvorsen, Michigan Technological University
Dr. Miquel Armando Ramirez, Universidad Veracruzana
Dr. Martin Yemefack, Institute of Agricultural Research for Development, Cameroon
J. Cardenas Castillo, Oruru Technical School, Bolivia
Dr. Thomas Van Dam, Michigan Technological University

Graduate Advisor: Dr. J. Buongiorno, U. of Wisconsin – Madison

Graduate Students (M.S.)

Biographical Sketch
Alex S. Mayer
Department of Civil & Environmental Engineering
Michigan Technological University

Professional Preparation
Brown University, Sc.B. Civil/Environmental Engineering, 1981
University of North Carolina at Chapel Hill, M.S. Environmental Engineering, 1987
University of North Carolina at Chapel Hill, Ph.D. Environmental Engineering, 1992

Appointments
September 2005-present: Director, Michigan Technological University Center for Water & Society
September 2002-present: Professor
September 1998-August 2002: Associate Professor
March 1992-August 1998: Assistant Professor
Department of Geological Engineering and Sciences
Michigan Technological University, Houghton, MI
September 2000-May 2001: Visiting Professor
Department of Civil Engineering and Geosciences
Technological University of Delft, Netherlands
August 1995-November 1995: Visiting Professor
Department of Chemical Engineering
University of Sonora
1981-1985: Civil Engineer
Water Resources Projects Section, Planning Division
East Bay Municipal Utility District, Oakland, CA

Five Relevant Publications

Five Other Publications
Synergistic Activities
AQUA3, ExCIT, SustR, and TIES Programs in Water Resources Management: managed projects, recruited and advised graduate and undergraduate students from Mexico, U.S. and Canada, developed curriculum, developed and led field trips dealing with Mexican water resources issues, working with engineers, economists, sociologists, etc., has led to several collaborative research and education initiatives.
Textbook on groundwater contamination: co-edited and co-authored with engineers, geologists, and soil scientists, book accessible to university professors and students and practitioners, funded by Fulbright Scholarship.
Rio Yaqui basin modeling project: principal investigator for effort to develop integrated hydrologic-economic-institutional model, involves working with economists, policy-makers, government agencies.
Michigan Tech Center for Water and Society: Director and co-founder of university-wide effort to integrate research, education and outreach efforts at Michigan Tech, involves engineering, forestry and environmental sciences, biology, chemistry, humanities and social science departments; state and federal agencies, non-governmental organizations, etc.
Watershed management plan for Huron Creek: lead investigator on multi-disciplinary group of faculty and students and community advisory group developing watershed management plan for Huron Creek, a small, highly-impacted creek that empties into Lake Superior. Development of plan has included local K-12 teacher and student involvement in gathering data, producing a community watershed interpretive program, and participation in a watershed advisory committee.

Michigan Environmental Education Curriculum Support (MEECS) program: Developed and authored several modules for middle school environmental curricula made available to all middle school science teachers in Michigan.

Courses, Workshops or Special Courses Taught During the Past Three Years
Undergraduate Courses: Geohydrology, Water & Society, Environmental Engineering Senior Design Project, Geological Engineering Senior Design Project
Graduate Courses: Mathematical Modeling of Earth Systems, Field Engineering for the Developing World
Workshops: Watershed Management Certificate Program (Sonora, Mexico)

Collaborators & Other Affiliations
Asbornsen, H., co-investigator, University of Iowa
Chadde, J., co-investigator, Center for Science, Mathematics and Environmental Outreach; Houghton, MI
Garcia Ruiz, J.L., co-investigator, U. Sonora, Hermosillo, Mexico
Gorman, H., co-investigator, Michigan Technological University, Houghton, Michigan
Hand, D., co-author, Michigan Technological University, Houghton, Michigan
Halvorsen, K., co-investigator, Michigan Technological University, Houghton, Michigan
Hassanizadeh, S.M., co-author, U. Utrecht, Utrecht, The Netherlands
Mihelcic, J., co-investigator, University of South Florida, Houghton, Michigan
Perez Lugo, co-investigator, University of Puerto Rico Mayagüez
Sivapalan, M., co-investigator, University of Illinois
Solomon, B., co-author, Michigan Technological University, Houghton, Michigan
Watkins, D., co-investigator, Michigan Technological University, Houghton, Michigan
Zhang, Q., co-investigator, Michigan Technological University, Houghton, Michigan
Zimmerman, J., co-investigator, Yale University

Graduate Advisor: Miller, C.T., U. North Carolina, Chapel Hill, NC

Recent STEM Graduate Dissertation/Thesis/Project Advisees
Bau, D., Ph.D. Environmental Engineering, 2006
Ballard, M., Ph.D. Environmental Engineering, in progress
Betz, K., M.S. Geological Engineering, 2006
Endres, K., Ph.D. Environmental Engineering, 2004
Fitzgerald, K., M.S. Geological Engineering, in progress
Kersten, L. M.S. Environmental Engineering, 2008
Munoz Hernandez, A., Ph.D. Environmental Engineering, 2009
Ollila Ojeda, M., M.S. Environmental Engineering, 2006
Robles Morua, A., Ph.D. Environmental Engineering, in progress
Rodriguez Ibarra, W., M.S. Environmental Engineering, 2005
Van Grinsen, M., M.S. Geology, in progress
Biographical Sketch for John S. Gierke, Ph.D., P.E.,

a. Professional Preparation
Michigan Technological University  Civil Engineering  BSCE 1984
Michigan Technological University  Civil Engineering  MSCE 1986
Michigan Technological University  Environmental Engineering  Ph.D. 1990

b. Appointments
Associate Professor - September 1996 to Present;
   Michigan Technological University, Houghton, Michigan 49931-1295
Visiting Associate Professor - January 1999 through December 1999
   University of Delaware, Newark, Delaware
Assistant Professor - July 1990 through August 1996
   Michigan Technological University, Houghton, Michigan 49931-1295
Summer Research Faculty Visitor - June 1991 to August 1991
   Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831.

c. Publications

(i) Five Relevant Publications

(ii) Five Other Significant Publications
d. Synergistic Activities
(1) Principal investigator for the Michigan Tech Remote Sensing for Hazard Mitigation and Resource Protection in Pacific Latin America Project, National Science Foundation Partnerships for International Research and Education, where research is conducted on developing, applying, and testing remote sensing in geologic hazards and water resources in Costa Rica, Ecuador, El Salvador, Guatemala, Nicaragua, and Panama; (2) Graduate advisor for M.S. students in Michigan Tech’s Masters International/Peace Corps programs in geohazards and in civil and environmental engineering where students conduct their masters research whilst serving in the U.S. Peace Corps; (3) Collaborating with faculty at the University of Puerto Rico—Mayaguez to involve their undergraduate geology students in remote sensing research in Pacific Latin America; (4) Organized a 1-day workshop on applications of remote sensing for characterizing groundwater aquifers in conjunction with the 9th Congress on Latin American Hydrogeology in Quito, Ecuador, July 7, 2008; (5) Research on hydrology of glacier melting in Alaska and invited for participating in a workshop (proposal pending) on the future impacts of climate change on glaciers and the ecology of the Andes.

e. Collaborators and Other Affiliations
(i) Collaborators and Co-Editors: Falta, Ronald W. (Clemson University), Imhoff, Paul (University of Delaware), McCray, John M. (Colorado School of Mines), Stewart, Bo (Praxis Environmental).
(ii) Graduate Advisor: Neil J. Hutzler, Michigan Technological University
(iii) Thesis Advisor for (last five years denoted in bold): Anderson, Cecilia P. (ERM-West), *Bachmann, Nancy-Jeanne (Emmons & Olivier Resources, Inc), Bruning, Jil N. (searching for employment), Carpenter, Michael D. (consulting), Castor, Meaghan G. (consulting), Ebisch, Jeffery (Coleman Engineering), El-Beshry, Manar, Fish, Randy E. (Peace Corps, serving in Tanzania), Fader, Caleb (Peace Corps, serving in Uganda), Fuchs, Valerie J. (Michigan Technological University), Gross, Essa L. (Michigan Technological University), Gu, Yingxin (McGill University), Harrison, Elizabeth (Los Alamos National Laboratory), Hegemann, Robert (Peace Corps, serving in Honduras), Hein, Gretchen L. (Michigan Technological University), Huntzinger, Deborah N. (Post-doc, University of Michigan), *Hutchins, Margot J. (Michigan Technological University), Jenson, Jeremy (Peace Corps, serving in Benin), Keating, Gordon (Los Alamos National Laboratory), Kremer, Theodore J. (Malcolm Pirnie, Inc.), Kucharski, Matthew J. (Peace Corps, serving in Philippines), Mackenzie, Heidi L. (Grenkowitz) (Ford Motor Company), Muraskey, Jennifer L. (Montgomery Watson), *Myre, Elizabeth A. (Engineering development work in Haiti), *Quinman, Joseph (ARCADIS), *Ritchie, Beatrice, Rios Sanchez, Miriam (Michigan Technological University), Sanders, Deborah L. (ERM-West), Sawall, R. Hardy (Geotrans), Schmunk, Steven W. (Marquette Intermediate School District), Sherman, Heidi M. (Consulting), Shonsey, Cara W. (Michigan Technological University), Smith, Gwynneth (Peace Corps, serving in Suriname), Stright, Lisa E. (Stanford University), Taege, Deborah A. (AMEC), **VanAntwerp, Darby J. (RMT), Vincent, Ashlee K. (Michigan Technological University), Wang, Congli (Consulting), *Wojick, Christopher L. (Michigan Technological University). *Served/serving as co-advisor, **Served as co-advisor, student at different university.

Advisor for 20 M.S. and 2 Ph.D. graduates, co-advisor for 3 M.S. and 2 Ph.D. graduates; currently advising 2 Ph.D. students and 10 M.S. students and co-advising 1 Ph.D. student.
Biographical Sketch: Andrew J. Storer

School of Forest Resources and Environmental Science
Michigan Technological University,
1400 Townsend Drive, Houghton, Michigan, 49931, USA
Telephone: (906) 487-3470, Email: storer@mtu.edu, Fax: (906) 487-2915

Professional Preparation
St. Anne’s College, University of Oxford. Pure and Applied Biology. B.A. (Hons) 1986
St. Anne’s College, University of Oxford. M.A. 1993
Department of Zoology, University of Oxford. Forest Entomology. D.Phil. 1993

Appointments
2005 – Present Associate Professor, Forest Insect Ecology, School of Forest Resources and Environmental Science, Michigan Technological University
2007 – Present Director, The Honors Institute, Michigan Technological University
2001 –2005 Assistant Professor, Forest Insect Ecology, School of Forest Resources and Environmental Science, Michigan Technological University
1998 - 2001 Assistant Research Entomologist, Division of Insect Biology, University of California, Berkeley.
1999 - 2001 Instructor, Department of Landscape Horticulture, Merritt College, Oakland.
1992 - 1997 Postdoctoral Researcher, Division of Insect Biology, University of California, Berkeley.

Publications (5 most closely related – from work in Africa or other locations outside the US)

Publications (5 other)


**Synergistic Activities**
1) Active research in forest health and educational programs in global technological leadership in Ghana.
2) Director of the Honors Institute at Michigan Technological University. This institute encourages undergraduates to develop research and other professional experience during their undergraduate career.
4) Member of the editorial board of the Journal of Pest Science (Springer). Subject editor for Forest Entomology

**Collaborators and other affiliations**
a) Collaborators and coeditors
Abeney, EA (Forest Research Institute of Ghana), Bonello, Pierluigi (The Ohio State University), Cobinna J.R. (Forest Research Institute of Ghana), Delisle, J. (Natural Resources Canada), Erbilgin, N. (University of Edmonton), Gordon, Thomas R. (University of California, Davis), Hyslop, MD (Michigan Technological University), Jurgensen MF (Michigan Technological University), Karnosky, David (Michigan Technological University), Marshall, J.M. (Michigan Technological University), McNee, William R. (Wisconsin Department of Natural Resources), McPherson, Brice A. (University of California, Berkeley), McCullough, Deborah (Michigan State University), Nagel, Linda M. (Michigan Technological University), Opuni-Frimpong, E. (Forest Research Institute of Ghana), Risch, AC (Swiss Federal Institute for Forest, Snow and Landscape Research), Ritokova, G. (UC Davis), Standiford, Richard B. (University of California, Berkeley), Schutz M (Swiss Federal Institute for Forest, Snow and Landscape Research), Shields JM (Michigan Technological University), Webster, CR (Michigan Technological University), Witter John A. (University of Michigan), Wood, David L. (University of California, Berkeley).

b) Graduate and Postdoctoral Advisors
Graduate: Martin R. Speight, University of Oxford; David Wainhouse, Forest Research, England
Postdoctoral: David L. Wood, UC Berkeley; Thomas R. Gordon, UC Davis

c) Thesis Advisor and Postgraduate Scholar Sponsor
Thesis Advisor to: Tara Bal (Michigan Technological University), Brian L. Beachy (deceased), Jessica A. Beachy (Michigan Technological University), Sarah Brodeur-Campbell (Michigan Technological University), Ryan DeSantis (University of Oklahoma), Michelle Freeman (Michigan Technological University), Elizabeth E. Graham (University of Illinois), Brian P. Henry (Washington DC), Jordan M. Marshall (Michigan Technological University), Emmanuel Opuni-Frimpong (Forest Research Institute of Ghana), Melissa Porter (Michigan Technological University), Bryan K. Roosien (Michigan Technological University), Justin M. Rosemier (Kentucky Wesleyan University).
Total advised: Graduate students: 13, Postdoctoral Scholars: 1
International Dual Graduate Degrees

Introduction

Michigan Technological University’s Strategic Plan calls for increased international opportunities for our students, faculty, and staff. Specifically, one of the bullet points under section 2.1 states:

“expand opportunities for, and encourage participation in, international experiences.”

Additionally, section 3.3 states:

“Address societal needs through global partnerships.

• expand international engagement through collaborations with universities, industry, and government;
• increase cross-cultural exchanges to promote understanding and discovery of new knowledge and processes.”

In accordance with the Strategic Plan, faculty members are increasingly interested in developing partnerships with colleagues and universities in other countries.

Interest in international dual (also known as double) degrees is growing nationwide and at Michigan Tech. Therefore, it is appropriate for the University to articulate a general policy regarding these types of degrees.

Proposed Policy for International Dual Graduate Degrees

International dual graduate degrees will be articulated through formal agreements between Michigan Tech and one or more collaborating universities. Students enrolled in an international dual graduate degree program must complete all of the requirements (both content and credit) for a degree at Michigan Tech. Students enrolled in an International Dual Degree program must also earn at least 50% of the credits required for a Michigan Tech degree through Michigan Tech.

Students pursuing an international dual graduate degree will receive a degree and diploma from both Michigan Tech and the collaborating university. When the degree and diploma awarded from each collaborating university are in the same academic area, up to 50% of the credits required for each degree may be used to fulfill degree requirements at Michigan Tech and another university. When the degree and diploma awarded from each collaborating university are in different academic areas, students may double-count up to 33% of the credits required for each degree (if the academic content covered by those credits can be appropriately applied toward each degree).

Each participating student’s final Michigan Tech transcript will indicate that the degree was earned as part of an international dual degree program and will provide the name(s) of the collaborating universities.
Students enrolled in international dual graduate degree programs will complete a thesis or dissertation and will be co-advised by a qualified faculty member from Michigan Tech and the primary collaborating university. If more than one collaborating university is involved in an agreement, the primary collaborating university will be the one at which a participating student will earn the most credits (in addition to the credits earned at Michigan Tech). Students will defend their thesis or dissertation at Michigan Tech and the primary participating university, either on-site or through the use of video or web-based conferencing.

Equivalence of Michigan Tech credits and credits earned at a collaborating university will be determined based on the basic principal that full-time enrollment at Michigan Tech requires the same amount of student effort as full-time enrollment at the collaborating university.

International dual graduate degree programs can only involve degrees that are already available at Michigan Tech. New degree programs cannot be developed initially as international dual graduate degrees.

**Proposed Process for Review of International Dual Graduate Degree Proposals**

1) Initial concept proposals will be developed by a member of the Michigan Tech faculty and a member of the Michigan Tech Graduate Faculty. Faculty seeking assistance or guidance in developing proposals are encouraged to contact the Graduate School. Concept proposals should identify the proposing faculty member, the name of the Michigan Tech graduate program that will offer the degree, a statement of the benefits of the proposed dual degree to Michigan Tech and the appropriate intellectual community, the name of the collaborating university(s), and the name of a correspondent faculty member at the collaborating university(s).

2) Concept proposals must be approved by the faculty of the department or school that hosts the degree program. For non-departmental degrees, initial approval can be granted by the dean of the college or school in which the proposing faculty member has their primary academic appointment.

3) Concept proposals must be approved by the dean of the college or school that hosts the degree program. For non-departmental degrees, initial approval can be granted by the dean of the college or school in which the proposing faculty member has their primary academic appointment.

4) After initial approvals are completed (steps 1-3) proposals will be submitted to the dean of the Graduate School for review. Upon successful preliminary review, the dean of the Graduate School will:
   a. Convene a faculty review committee that includes a representative from the Graduate Faculty Council, a representative of the University Senate who is also a member of the Graduate Faculty, and the proposing faculty member;
   b. Submit the concept proposal to the manager of Sponsored Operations who will develop an initial draft agreement.

5) The draft agreement will be reviewed by the dean of the Graduate School, the faculty review committee, the director of International Programs and Services, and the University’s legal
counsel. Recommendations for modification will be acted upon by the manager of Sponsored Operations. Upon successful completion of the internal review process, copies of the agreement will be forwarded to the collaborating university for review and modification. Once the terms of the agreement are agreed upon by the collaborating universities, it will be signed by the president and provost at Michigan Tech and by the leadership at the collaborating university(s).
Proposal:  
Masters of Science Program in Security and Medical Informatics

Submitted by:  
School of Technology  
January 28, 2010  
Version: 1.5

I. General Description
This proposal recommends the establishment of a Graduate Program in Security and Medical Informatics at Michigan Tech University. Marquette General Health System (MGHS), a prominent teaching medical institution located in the Upper Peninsula of Michigan, will partner with the School of Technology to provide a comprehensive education and research entity for this Graduate Program.

II. Rationale
Security and medical informatics are two rapidly developing fields in our society. Medical informatics is the intersection of information science, computer science, and healthcare. This field deals with the resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health and biomedicine. Securing computer network systems has become a vital part of our global society. Many institutions and organizations depend on electronic data to conduct operations daily. This includes areas such as the healthcare, financial, military, and academic sectors. Established regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and Graham-Leach-Bliley Act (GLBA) include specific security and compliance provisions for their respective sectors. With the advancement of technology in the medical field, accompanied by the need to keep patient information confidential, a graduate program that addresses the education and research needs of these two closely related fields is critical.

Michigan Tech University has established strong and growing research in the areas of computer/information security and medical informatics. Likewise, the university has recently made a significant commitment to education and research in this field by supporting the strategic faculty hiring initiative in the area of Health. The addition of the Security and Medical Informatics Graduate Program would strongly support the Health initiative and align with the strategic plan of the university.

The Masters of Science in Security and Medical Informatics is designed to:
1. deepen students' understanding and knowledge of medical informatics and computer/information security;
2. provide students with research opportunities within the intersecting fields of medical informatics and security;
3. provide a flexible curriculum to allow for both traditional and nontraditional graduate students.

III. Related Programs
Graduate programs in medical informatics or closely related fields exist at a few other institutions, including South Dakota State University, Drexel University, Johns Hopkins, Stanford, and the University of Illinois Chicago. Most of the mentioned programs focus strictly on management and technical aspects of medical informatics. Johns Hopkins provides a similar security infrastructure to accompany their health related courses, but our program has a stronger emphasis on patient records, the electronic medical records system, and the interoperability of these systems.

IV. Projected Enrollment
We estimate the Graduate Program to have 15-20 degree-seeking students and 15 non-degree seeking students enrolled over the first three years with an anticipated steady-state enrollment of 30-40 students. We expect 25% of the degree-seeking students in the program to be traditional students and the remainder to be nontraditional students enrolled strictly through distance learning. Non-degree seeking students would take courses that can be applied to professional certifications such as the Certified Professional in Health Information Technology (CPHIT). The courses are highlighted in the next section.
V. Curriculum Design
The Security and Medical Informatics Graduate Program requires 33 credits of course work and research for the MS degree.

Course work – Minimum of 27 credits must be taken from the following courses:
1. TSMI 5111 - Security and Privacy* +
2. TSMI 5121 - The Healthcare System* +
3. TSMI 5131 - System Analysis and Design* +
4. TSMI 5141 - Electronic Health Records and e-Health Implementation*
5. TSMI 5151 - Application Integration and Interoperability*
6. TSMI 5161 - Database Management and Security*
7. TSMI 5211 - Java Security
8. TSMI 5221 - Protocols and Systems for Internet and Web Security
9. TSMI 5231 - Statistical Methods for Intrusion Detection
10. TSMI 5241 - Designing Security Systems
11. TSMI 5251 - Advanced Topics in Network Security
12. TSMI 5261 - Health Informatics Decision and Support
13. TSMI 5271 - HIPAA Implications for Public Health +

* HIT Certification course
+ Course instructed by Marquette General Health System

Research Thesis – 6 credits
15. TSMI 5999 - Master's Research

Course Descriptions:
1. TSMI 5111  Security and Privacy
   Examines key health information security, policy and procedures. Investigates how to distinguish elements of a security audit and key security policies. Analyzes the roles of people maintaining health information security and explains elements of these roles within the organization.
   Credits: 2.0  Lec-Rec-Lab: (2-0-0)
   Semesters Offered: Fall
   Restrictions: Must be enrolled in one of the following Levels: Graduate

2. TSMI 5121  The Healthcare System
   Provides an overview of healthcare's transition from paper to electronic format and examines characteristics of healthcare organizations, the interrelationships among healthcare components, the role that government, regulatory, professional and accreditation agencies play within healthcare, and describes the roles of healthcare professionals and the organizational structure in which they work.
   Credits: 2.0  Lec-Rec-Lab: (2-0-0)
   Semesters Offered: Spring
   Restrictions: Must be enrolled in one of the following Levels: Graduate

3. TSMI 5131  System Analysis and Design
   Provides in-depth knowledge of tools that are available to perform systems analysis, examines the key factors to be considered in a systems design. emphasizes the importance of communication through both of these processes, and an understanding of the primary factors in measuring the benefits of systems implementation. Course will also examine strategies and key factors in purchasing systems. This includes analysis of opportunities and risk of integrating single vendor, hybrid, and other factors when examining system acquisition.
   Credits: 3.0  Lec-Rec-Lab: (3-0-0)
   Semesters Offered: Fall
   Restrictions: Must be enrolled in one of the following Levels: Graduate

**Possible course substitution: BA 3220 – Systems Analysis and Design
4. **TSMI 5141 Electronic Health Records and e-Health Implementation**
   Explores the difference between Electronic Medical Record (EMR) and Electronic Health Record (EHR). Discusses challenges and implementation of both EMR and EHR. Provides security analysis of both types of records and the maintenance of these systems.
   Credits: 3.0  Lec-Rec-Lab: (2-0-1)
   Semesters Offered: Spring
   Restrictions: Must be enrolled in one of the following Levels: Graduate

5. **TSMI 5151 Application Integration and Interoperability**
   Defines and explains the role of interoperability in the development of a functioning EHR. Analyzes predominant standardization in the healthcare field such as ASTM and HL7. Examines the challenges to the development of interoperability in healthcare.
   Credits: 3.0  Lec-Rec-Lab: (2-0-1)
   Semesters Offered: Fall
   Restrictions: Must be enrolled in one of the following Levels: Graduate

6. **TSMI 5161 Database Management and Security**
   Identifies database solutions and key elements of an enterprise data warehouse. Explains how to apply best practices for development of data warehouses and distinguish between a clinical data repository and enterprise data warehouse. Investigates the role of Master Patient Index and the aggregation of patient data in databases. Finally, the course defines security practices for a database environment.
   Credits: 3.0  Lec-Rec-Lab: (2-0-1)
   Semesters Offered: Spring
   Restrictions: Must be enrolled in one of the following Levels: Graduate
   **Possible course substitution: CS 4421 – Database System**

7. **TSMI 5211 Java Security**
   This course provides comprehensive coverage of the security aspects of the Java platform. Java's security model and the VM and language features that support security are covered. Java APIs and Java Cryptography APIs are addressed in Java security. This course analyzes Java security platforms and Java APIs within the healthcare sector.
   Credits: 3.0  Lec-Rec-Lab: (2-0-1)
   Semesters Offered: Fall
   Restrictions: Must be enrolled in one of the following Levels: Graduate

8. **TSMI 5221 Protocols and Systems for Internet and Web Security**
   Course focuses on the most widely used systems and protocols for security on the Internet and on the Web. The Internet refers to the infrastructure or the underlying protocols and routing. The Web describes applications that run on the Internet. Detailed focus is on browsers, web servers, and communication protocols on the Internet, as well as how to deal with viruses and distributed denial of service attacks. Some of the protocols/systems covered in detail will include TCP/IP, SSUTLS, IPsec, SSH, PGP, firewalls, IDS systems, and Kerberos.
   Credits: 3.0  Lec-Rec-Lab: (2-0-1)
   Semesters Offered: Spring
   Restrictions: Must be enrolled in one of the following Levels: Graduate
   Prerequisite: TSMI 5221
   **Possible course substitution: EE 5723 – Computer and Network Security**

9. **TSMI 5231 Statistical Methods for Intrusion Detection**
   This course will provide an introduction to the data and methodologies of computer intrusion detection. The focus will be on statistical and machine learning approaches to detection of attacks on computers. Topics include network monitoring and analysis, network based attacks such as probes and denial of service attacks, host-based attacks such as buffer overflows and race conditions, and malicious code such as viruses and worms. Statistical pattern recognition methods will be described for the detection and classification of attacks.
   Credits: 3.0  Lec-Rec-Lab: (2-0-1)
   Semesters Offered: Fall
Restrictions: Must be enrolled in one of the following Levels: Graduate

10. TSMI 5241 Designing Security Systems
This course provides an overview of techniques used in the design of secure systems. Primary focus of the course will be on real-world case studies. Students will examine attacks on deployed systems and then investigate how these vulnerabilities have been subsequently addressed. Additionally, the course will examine the practical advantages and shortcomings of several notions of provable security. Students will be expected to read, understand, and present recent research papers to the class.
Credits: 3.0 Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring
Restrictions: Must be enrolled in one of the following Levels: Graduate
Prerequisites: TSMI 5221 and TSMI 5111

11. TSMI 5251 Advanced Topics in Network Security
This course focuses on advanced research topics in communications security. The course is structured as a research seminar where students present research papers to the class. Topics include protocol analysis, security in inter-domain routing, broadcast authentication protocols, covert channels and anonymous communication, key management, advanced trace-back schemes, and attack propagation modeling. A course project is required.
Credits: 3.0 Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring
Restrictions: Must be enrolled in one of the following Levels: Graduate
Prerequisite: TSMI 5241

12. TSMI 5261 Health Informatics Decision and Support
This course addresses issues related to decision modeling based on health sciences data in terms of analysis, construction, and evaluation. Clinical decision support architectures are examined. An array of decision support tools is considered, and the knowledge representations employed in these tools are discussed.
Credits: 3.0 Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring
Restrictions: Must be enrolled in one of the following Levels: Graduate

13. TSMI 5271 HIPAA Implications for Public Health
This course focuses on the administrative and technical provisions of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which mandates a variety of healthcare standards as well as rules for electronic transactions and code sets. This course is designed to provide system implementers in the public health field with an understanding of and hands-on experience with HIPAA regulations, implications, and a perspective of the impact on the future of the health care information infrastructure regarding the use of information technologies.
Credits: 3.0 Lec-Rec-Lab: (3-0-0)
Semesters Offered: Spring
Restrictions: Must be enrolled in one of the following Levels: Graduate

14. TSMI 5281 Healthcare Security Management
This course will address information security in the public health and medical fields, with special emphasis on clinical care, research and the role of the academic medical center. Course will also focus on disaster recovery and response, anonymization of records, billing, communication of public health information to EHRs, along with physical and administrative security.
Credits: 3.0 Lec-Rec-Lab: (3-0-0)
Semesters Offered: Fall
Restrictions: Must be enrolled in one of the following Levels: Graduate

15. TSMI 5999 Master's Research
The study of an acceptable security and medical informatics research problem and the preparation of a thesis.
Credits: variable to 6.0; Repeatable to a Max of 6; Graded Pass/Fail Only
Semesters Offered: Fall, Spring, Summer
Restrictions: Permission of department required; Must be enrolled in one of the following Levels: Graduate

VI. Library and other Learning Resources
To be defined

VII. Computing Access Fees
A computer access fee of $210 per semester will be required for students enrolled in this program and additional Distance Learning fees may be required for on-line courses.

VIII. Faculty
Key faculty members for this graduate program are listed below:
- Yu Cai – Assistant Professor, School of Technology (http://www.tech.mtu.edu/people/yu_cai_CV.pdf)
- Chunming Gao – Assistant Professor, School of Technology (http://www.tech.mtu.edu/people/chunming_gao_CV.pdf)
- Guy C. Hembroff – Chair, CNSA Program/Assistant Professor, School of Technology (http://www.tech.mtu.edu/people/guy_hembroff_CV.pdf)
- Liran Ma – Assistant Professor, School of Technology (http://www.tech.mtu.edu/people/liran_ma_CV.pdf)
- Xinli Wang – Assistant Professor, School of Technology (http://www.tech.mtu.edu/people/xinli_wang_CV.pdf)

IX. Description of Available/Needed Equipment
The following contains a list of hardware and software needed for this Graduate program:
- Computer PCs/Laptops
- Selected Software (i.e. EMR software, database software, virtualization software)
- Routers/Switches/Firewalls
- Biometric Devices
- VoIP Technologies
- Smart Cards

X. Program Costs
Program Costs display the overall funding mechanism to illustrate a comprehensive budget and demonstrate forecasting to achieve revenue and sustainability for this graduate program. Steady state enrollment is anticipated in year four and thereafter.

Non-degree seeking students are individuals who are registered to take courses, possibly to obtain their CPHIT certificate, but are not registered in the Security and Medical Informatics Graduate program.

<table>
<thead>
<tr>
<th>PROGRAM REVENUE</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Years 4-n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment (MS students)</td>
<td>8</td>
<td>18</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Enrollment (non-degree seeking)</td>
<td>6</td>
<td>12</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Tuition revenue (MS students - 18 credits/year at $595/credit)</td>
<td>$85,680</td>
<td>$192,780</td>
<td>$214,200</td>
<td>$214,200</td>
</tr>
<tr>
<td>Tuition revenue (non-degree seeking - 16 credits/year)</td>
<td>$57,120</td>
<td>$114,240</td>
<td>$142,800</td>
<td>$142,800</td>
</tr>
<tr>
<td>Total tuition revenue</td>
<td>$142,800</td>
<td>$307,020</td>
<td>$357,000</td>
<td>$357,000</td>
</tr>
</tbody>
</table>

PROGRAM REVENUE (cont.)

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Years 4-n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive returned to program</td>
<td>$11,250</td>
<td>$22,500</td>
<td>$30,000</td>
</tr>
<tr>
<td>Total annual revenue</td>
<td>$154,050</td>
<td>$329,520</td>
<td>$387,000</td>
</tr>
</tbody>
</table>
PROGRAM EXPENSES

Additional Michigan Tech Faculty
Salary ($80,000 x 1.4) $112,000 $112,000 $112,000 $112,000

MGH Faculty
Salary ($65,000 x 1.4) $84,000 $84,000 $84,000 $84,000

Total salaries $196,001 $196,001 $196,001 $196,001

Journals (5% annual increase) $5,350 $5,618 $5,899 $6,194
Graduate Assistantships ($20k/year) $40,000 $40,000 $60,000 $60,000
Computer equipment ($5k/year towards replacement) $5,000 $5,000 $5,000 $5,000
Total non-salary $50,350 $50,618 $70,899 $71,194

Total annual expenses $246,351 $246,619 $266,900 $267,195

REVENUE – EXPENSES

$92,301 $82,901 $120,100 $131,055

One-time startup costs:
Marketing & Recruiting $10,000
Library and Monographs $3,000
Online Infrastructure $50,000
Computer Equipment $20,000
Graduate Computer Research/Course Lab $215,000
Total One Time Costs: $298,000

Potential Department of Labor (DoL) Grant Funding
**Submitted October 6, 2009
Funding 2010 $198,350
Funding 2011 $20,000
Funding 2012 $80,000
Projected DoL Funding $298,350

XI. Space
Graduate Research/Course Lab (funding specifics listed above)

XII. Accreditation
Not applicable

XIII. Planned Implementation
This program would begin offering courses fall semester 2010.
XIV. Admission Criteria:

This graduate program is open to excellent candidates who hold a Bachelors degree with sufficient technical and health-related backgrounds in information technology. We anticipate our graduate student population to have undergraduate degrees in technical areas such as: bioinformatics, computer science, computer engineering, health informatics, management information systems, and security/network engineering.

Recommended test scores for admission are as follows:

GRE General Test – combined score of 1200
TOEFL Test: 550 (For International applicants only).

These scores serve as general guidelines for admission. The Admissions Committee, in making its final decision, will consider the combination of professional knowledge, academic excellence, letters of recommendation, and the Statement of Purpose, as well as, GRE and TOEFL scores of the applicant.

XV. SMI Graduate Faculty Workload and Assignments:

**Faculty Work Load with Graduate Program**

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UG</td>
<td>GR</td>
</tr>
<tr>
<td>Cai, Yu</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gao, Chunming</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hembroff, Guy</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ma, Liran</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Miller, Danny (lecturer)</td>
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<td>Wang, Xinli</td>
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<tr>
<td>Lecturer</td>
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<tr>
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<td>2</td>
</tr>
<tr>
<td>New hire (MGHS)</td>
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<td>2</td>
</tr>
<tr>
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<td>8</td>
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</tbody>
</table>

**Faculty Graduate Course Assignments**

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tbody>
<tr>
<td>Cai, Yu</td>
<td>TSMI 5251</td>
<td>TSMI 5221</td>
</tr>
<tr>
<td>Gao, Chunming</td>
<td>-------------</td>
<td>TSMI 5161</td>
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<td>Hembroff, Guy</td>
<td>TSMI 5151</td>
<td>TSMI 5141</td>
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<td>Ma, Liran</td>
<td>TSMI 5231</td>
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<tr>
<td>Wang, Xinli</td>
<td>TSMI 5211</td>
<td></td>
</tr>
<tr>
<td>New hire (MTU)</td>
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<td>TSMI 5261</td>
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<tr>
<td>New hire (MGHS) -1st course</td>
<td>TSMI 5111</td>
<td>TSMI 5121</td>
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<td>MGHS Faculty - 2nd Course</td>
<td>TSMI 5131</td>
<td>TSMI 5271</td>
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XVI. Security and Medical Informatics Course Sequence Flow Chart:
Committee proposal for the Graduate Faculty Council to investigate the need for and means to achieve a Women’s Center and/or Lactation Facilities

Presented by Louise Nelson Dyble and Audrey Mayer, Social Sciences
February 2, 2010

Over the past several decades, universities and other employers have begun to recognize that genuine gender equity requires more than just equal opportunities for promotion or fair compensation: it also requires appropriate facilities that support the productivity and health of everyone. One area of opportunity for Michigan Tech is in the real, physical space on campus. The Graduate Faculty Council is in a position to support an ad hoc committee to investigate and assess the need for facilities on campus such as a women’s center and/or dedicated lactation rooms.

Why a Women’s Center?
Creating a supportive and welcoming environment and providing resources for women specifically could be a way to attract, recruit and retain more high-achieving women, and to promote their success over the long-term. It could also represent a very tangible, visible commitment by the university to achieving its goals for equity and balance. Once established, it could have lasting, cumulative benefits for the campus community. It could provide opportunities for networking, education, mentoring, and interaction between staff, students, and faculty. It could also serve as a center for cultural exchange, drawing upon the diversity of the Michigan Tech community.

Why Lactation Facilities?
There is broad recognition that successful breastfeeding requires comfortable, secure, and dignified workplace facilities for mothers. Graduate students are often at an age when child bearing can interfere with achievement at a crucial time in a competitive academic career. In addition, they are vulnerable to discrimination and marginalization. Providing on-campus facilities will minimize problems associated with parenthood. Staff members will also benefit significantly, and that a lactation facility will improve performance and retention. Faculty members, particularly at the adjunct and assistant level, job candidates, and visitors to campus could also benefit from adequately appointed facilities.

Finally, every member of the campus community, male and female, has an interest in optimizing productivity, health, and morale.

Initial Goals
This is a proposal for a research committee. Appropriate committee sponsorship, specific purpose and goals, strategic course of action, and potential sources of institutional support and funding are all questions that need to be answered.
MORE INFORMATION:

United States Breastfeeding Committee
[http://www.usbreastfeeding.org](http://www.usbreastfeeding.org)

National Women’s Health Information Center, U.S. Dept. of Health and Human Services

POTENTIAL MODELS:

University of Rhode Island, ADVANCE Office and Work-Life Committee
Established four dedicated, equipped nursing rooms, as well as a policy to provide designated private space for all nursing employees.
[http://www.uri.edu/advance/work_life_support/lactation_facilities.html](http://www.uri.edu/advance/work_life_support/lactation_facilities.html)

Georgia Tech Women’s Resource Center and Nursing Moms Program
Provides extensive support and education for women on campus, and established three dedicated nursing rooms with equipment using ADVANCE funding.
[http://www.advance.gatech.edu/archive/lactation/](http://www.advance.gatech.edu/archive/lactation/)
Rationale: In the last two years several new graduate certificate programs have been established and others are in the proposal stage. This revised Graduate Certificate Policy will build on existing policy and add the following provisions:

a. recognize the student category: graduate certificate-seeking. This student will be admitted to the Graduate School, but will not be seeking a specific graduate degree.
b. establish a residency policy for graduate certificate-seeking students and degree-seeking students also pursuing a graduate certificate.
c. establish a differential in maximum credits for the certificate: degree-seeking, 12 credits; certificate-seeking, 15 credits
credit hours may normally be 3000 or 4000 level courses, however interdisciplinary and multidisciplinary certificates may have a maximum of 6 credit hours at the 3000 or 4000 level. All other credits must be at the 5000 or higher level, and may include no more than 3 credit hours of research. A minimum grade of B is required in all course work. Graduate Faculty must teach all courses required for a Graduate Certificate, except for the 3 credit hours of allowed 3000 or 4000 level courses. Because Certificates are not degree programs, double counting is allowed in all cases.

Applicants to a Graduate Certificate program must have a Bachelors degree or equivalent. Individual Graduate Certificate programs may have additional admission requirements. The time limit during which a student is expected to complete all of the requirements of a Graduate Certificate may vary, but is not to exceed four years.

Faculty Endorsement and University Approval of a New Graduate Certificate. Graduate Certificates may be proposed by individual faculty, groups of faculty, departments, or groups of departments in any academic or research unit at Michigan Tech. Graduate Certificates may be proposed in disciplines without a preexisting graduate degree program. A proposed Graduate Certificate curriculum may contain fieldwork, distance learning, and laboratory courses in addition to traditional classroom offerings. Additional admission requirements for a Graduate Certificate program beyond that stated above must be listed in the proposal.

Proposals for Graduate Certificate programs will follow the usual procedures for university programs, and be submitted to the Senate by the Provost.

Adopted by Senate: 25 February 2004
Approved by President: 3 March 2004

Individuals seeking to earn a graduate certificate from Michigan Tech should note the following:

1) Applicants to a Graduate Certificate program must have a Bachelors degree or equivalent. Individual Graduate Certificate programs may have additional admission requirements. The time limit during which a student is expected to complete all of the requirements of a Graduate Certificate may vary, but is not to exceed four years.

2) No more than 3 credit hours may normally be 3000 or 4000 level courses, however interdisciplinary and multidisciplinary certificates may have a maximum of 6 credit hours at the 3000 or 4000 level. All other credits must be at the 5000 or higher level, and may include no more than 3 credit hours of research.

3) A minimum grade of B is required in all course work. Graduate Faculty must teach all courses required for a Graduate Certificate, except for the of allowed 3000 or 4000 level courses.

4) A maximum of 1/3 of the coursework credits required for a certificate can be transferred from another university. Research credits (if required for the certificate) must be earned through Michigan Tech.

5) Non-degree seeking students who earn Michigan Tech credits prior to formal admission to a certificate program can apply those credits to satisfy up to 1/3 of the coursework-credit requirements for the certificate. Non-degree seeking students should update their enrollment to
<table>
<thead>
<tr>
<th>Certificate-seeking prior to earning more than 1/3 of the coursework credits required for the certificate. Research credits earned by non-degree seeking students cannot be applied toward a graduate certificate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6) <strong>Credits may be double counted between between a single certificate and a single master's or PhD program.</strong></td>
</tr>
<tr>
<td>7) <strong>Michigan Tech requires that students earning a graduate certificate complete a minimum of 15 credits beyond the bachelor’s degree. Students concurrently earning a graduate certificate in addition to a graduate degree at Michigan Tech are allowed, with the approval of the certificate program advisor, to complete 12 out of the 15 credits required for the certificate in order to obtain both certificate and graduate degree. A 12 credit certificate will not be awarded until completion of a Michigan Tech graduate degree.</strong></td>
</tr>
</tbody>
</table>

**Faculty Endorsement and University Approval of a New Graduate Certificate.** Graduate Certificates may be proposed by individual faculty, groups of faculty, departments, or groups of departments in any academic or research unit at Michigan Tech. Graduate Certificates may be proposed in disciplines without a preexisting graduate degree program. A proposed Graduate Certificate curriculum may contain fieldwork, distance learning, and laboratory courses in addition to traditional classroom offerings. Additional admission requirements for a Graduate Certificate program beyond that stated above must be listed in the proposal.

Proposals for Graduate Certificate programs will follow the usual procedures for university programs, and be submitted to the Senate by the Provost.
Proposal to Modify and Rename the “Senior Rule” Policy

Proposed Name for Modified Policy: “Integrated Undergraduate/Graduate Degree Programs” or “Undergrad/Grad Programs”

Goals:

• Develop a flexible policy framework that will allow individual departments/programs to offer integrated undergraduate/graduate degree programs that meet the needs of their students, faculty, and academic discipline.
• Attract outstanding Michigan Technological bachelor’s students into our master’s and doctoral programs.
• Allow exceptional Michigan Tech students an early opportunity to become engaged in research.
• Allow students to pay undergraduate tuition for a limited number of credits taken while an undergraduate student, and apply these credits toward a graduate degree.
• Allow students to double count a limited number of credits towards both the Bachelor’s and Master’s degrees

Limitations:
This program will only be available to undergraduate students who will complete a bachelor’s degree at Michigan Tech.

Current Policy:
The current “Senior Rule” Policy is:
(http://www.mtu.edu/registrar/students/registration/policies/senior-rule/)

“While finishing an undergraduate degree, students are allowed to take courses which could apply to a graduate degree. However, a course cannot be applied to both a graduate and an undergraduate degree.

A Senior Rule form must be completed and submitted to the Registrar’s Office prior to the end of the 6th week of class for the course semester. Upon submission, the student’s academic record will be changed to show graduate status for the course designated. Once the academic record has been changed to show graduate status for a particular course, it cannot be changed back to count toward an undergraduate degree.

Senior Rule Guidelines
• A student so enrolled and carrying 6 credits or more in 5000 or 6000 level courses may carry no more than 16 credits of course work per semester.
• The total number of Senior Rule credits may not exceed one-third of the required non-research course credits.”

Comment [nbs1]: There was concern that a student could reduce the number of graduate research credits by engaging in undergraduate research and the faculty concerned did not want this. We could either eliminate this sentence or modify it by adding “via Independent Study at the undergraduate level!” They were not against undergraduate research but they didn’t want a student to be able to reduce the graduate research credits, but felt research could be done using an independent study course that could be transferred in as course work. The faculty making comments said they have undergraduate research courses in their departments but don’t think those ever get used. Comments from JEH about the motivation for the research component might be helpful.
Proposed Policy:

Summary of Changes: Students will be allowed to use the modified senior rule Integrated Undergraduate/Graduate Degree Programs policy to accumulate up to one-third of the credits (either regular coursework or independent study or special topics courses or a combination) while enrolled as an undergraduate. Changing this provision will allow students to earn a larger number of credits toward a graduate degree while an undergraduate student, and students can begin earning graduate credits at any time during their undergraduate career (with permission of the course or research credit advisor and the Graduate Program Director for the students intended graduate program). Students will also be allowed to double count up to six (6) credits toward both an undergraduate and graduate degree.

Revised Policy Statement:
While working toward an undergraduate degree, students are allowed to take courses which may be applied toward a graduate degree. The total number of graduate credits earned while an undergraduate may not exceed one-third of the credits required for the graduate degree in the student’s intended graduate program. In most situations, this means that a student may accumulate a maximum of ten (10) credits as an undergraduate that can later be applied toward the graduate degree, however each department/school may set lower maximum allowable credits.

Up to six (6) credits of the graduate credits may be applied towards both an undergraduate and graduate degree.

Students who take six (6) credits or more in 5000 or 6000 level courses may carry no more than sixteen (16) credits per semester.

Undergraduate students who wish to apply courses towards a graduate degree must submit an Integrated Undergraduate/Graduate Degree Programs form to the Registrar’s Office by Wednesday of the second week of the semester in which the graduate degree courses are taken. Once a student has submitted the form, the courses designated for use toward a graduate degree only cannot be applied toward an undergraduate degree.

Procedure:
Upon submission, the student’s academic record will be changed to show graduate status for the courses that are not intended to be double counted. The Registrar’s Office will then send a copy of the form to the graduate school, and the graduate school will keep the form with the student’s records. Students will be allowed to use all courses for which academic status is indicated, as well as the double counted courses, on their graduate degree schedule. Once the academic record has been changed to show
graduate status for a particular course, it cannot be changed back to count toward an undergraduate degree.