Proposal for an Interdisciplinary MS/PhD Program in Human Factors and Ergonomics
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Proposed Program & Degree Objectives
We propose to establish a new interdisciplinary PhD; MS Plan A and MS Plan C degree program in Human Factors and Ergonomics (hereafter referred to as the “Human Factors” of HF program for brevity). The main focus of the Human Factors program will be the PhD degree, with the MS Plan A (or C) serving primarily as an exit for those in the PhD track who do not complete their PhD, and the MS Plan C to serve self-funded industry students who are interested in honing their credentials but who are not necessarily research oriented.

This program will build on the existing structure, faculty and community established by the current free-standing graduate minor in Human Factors and Ergonomics. The goals of this program are to bring in new graduate students, and retain MS students interested in earning PhD, who would otherwise go to other Universities in order to obtain a strong Human Factors educational focus (see student letters). Additionally, this program would fill currently unmet needs in local industry, national industry, and government for graduates and interns with strong Human Factors backgrounds (see industry letters). Currently, they meet this need by hiring HF graduates from other Universities such as Wisconsin, Illinois, Toronto and Embry Riddle. We wish to make Minnesota the place that biomedical, aerospace, computing, health care, military and other industries come to “shop” for graduates with Human Factors expertise, and to form research partnerships with faculty. Finally, there is a mutual synergy between a human factors graduate program, and faculty research programs that are continually searching for well trained human factors students to support.

Departmental and Collegiate Home
The collegiate home will jointly be the Institute of Technology and the College of Design. The departmental home will initially be the department of Mechanical Engineering. We are requesting a memorandum of agreement (MOA) between the deans stating that the program income should go to the DGS’s unit to cover program costs (which will primarily be support staff to assist students and help faculty with processing of applications and other program related paper work.) The initially proposed DGS is Hayes, so the program income will initially go to IT. If future DGSs come from other departments, whether in the Institute of Technology or the College of Design, the MOA will need to be renegotiated to direct program income to the DGS’s unit to cover administrative costs.

Geographic Location: Twin Cities Campus

Focus and Rationale
Goals
1. Better serve unmet needs of current students, potential students and faculty with research interests in Human Factors and Ergonomics, as elaborated in the following “Need” section.
2. Provide an interdisciplinary, “human-centered systems” approach to Human Factors that is unique in the region and the country,
3. Increase the attractiveness of Minnesota for students, faculty and research funding in the area of Human Factors,
4. Increase the visibility inside and outside the University, particularly with industry, for the Human Factors faculty, students and their research accomplishments,
5. Strengthen numerous education and research programs across the University through synergies created by collecting a “critical mass” of expertise in Human Factors from multiple colleges including the College of Design, the Institute of Technology, the College of Education and Human Development, (and possibly the College of Liberal Arts.)

Need

The University of Minnesota is situated in the midst of many companies that focus on areas ranging from manufacturing, aerospace, defense and biomedical products. These companies have a great need for graduates with Human Factors expertise to help create safe, usable, and effective products and processes. However, these companies do not currently view the University of Minnesota as “the place to go” for students trained in Human Factors, nor for faculty research partnerships to address Human Factors challenges.

Despite the University of Minnesota’s substantial resources in Human Factors, the lack of a centralized Human Factors Masters/PhD program diminishes the visibility of the effort. While there is an existing Human Factors Graduate Minor program, a minor program, while useful, is not viewed externally (or internally) as providing sufficiently substantial training to meet industry needs.

There is also much internal need for a Human Factors program; within the University of Minnesota there are several large research laboratories with substantial funding that focus primarily on Human Factors Issues at the University of Minnesota: the Human First Laboratory, the Decision Support Laboratory, the Center for Design in Health, and the Affordance Perception-Action Laboratory are a few examples. However, while these laboratories are well funded, they have a perennial challenge of attracting, training and retaining graduate students with a Human Factors focus because of the lack of appropriate graduate training programs.

Audience

Letters of support have been provided in the appendices documenting interest in a Human Factors graduate program from industry, students, and faculty. Those groups include:

1. People working full and part-time in local industries who plan to continue working while they earn their graduate degrees. These people will come from organizations such as Honeywell, Lockheed, Medtronic, Mayo Clinic, and the Veterans Administration,
2. Prospective full-time students coming from outside the University of Minnesota,
3. Human Factors research staff currently working at the University of Minnesota who currently hold BS, MS or MA degrees, but wish to advance their education both to improve their skills in their current positions, and to acquire the qualifications to advance their long-term research careers. These people may wish to become either part-time or full-time students while continuing their research positions.

Background: What is Human Factors?

Human Factors involves the systematic application of knowledge about human strengths and weaknesses to design processes that facilitate better human performance and to design technology, products, and infrastructure that enhance processes. Human Factors is an inherently interdisciplinary area requiring a joint understanding of humans,
technology and their interplay so as to inform the design of human-centered systems, including the component processes, technology, products, and infrastructure. Human Factors professionals strive to improve people’s lives by designing human-centered systems (and the components in them) in order to make it easier for people to function. Examples of human-centered systems include the interaction of humans and bio-medical devices, automobiles and spacecraft, intelligent computer assistants, clothing, homes, and work processes and environments. Human Factors is inherently interdisciplinary. It encompasses basic science of how people think; how social organizations behave; principles of design and their application in specific domains. Consequently, training in Human Factors requires the expertise of faculty from many colleges including the Institute of Technology, College of Design, Liberal Arts, Education and Human Development. Additional expertise that is helpful to Human Factors resides in the School of Public Health, the Medical School and the Carlson School.

Innovative product development companies, such as Boston Scientific, Google and Apple, value Human Factors because they see it as a key to competitiveness in the global market place. To be successful, a product or process must not only work well in a technological sense, its intended users must also find it easy to understand with minimal training, easy to use, and the interface should reduce the probability of errors (rather than increase it). For these reasons, there is much recognized need for Human Factors expertise in the job market. This need is only increasing as we become more dependent on increasingly complex technological systems. Such technology and the processes associated with it must be designed with the humans who must use them in the forefront, else they may be difficult to understand and use, may not actually meet the needs of the intended audience, or have dire safety consequences that may be life threatening.

**Human Factors at other Universities in North America**

The major programs in Human Factors in North America tend to be housed with in a wide range of departmental homes reflecting the interdisciplinary nature of human factors. Departments housing human factors programs range from: Aviation/Aerospace, Psychology, Industrial, and Mechanical Engineering departments. (Appendix II lists 36 Human Factors programs in the US and Canada). With a few exceptions, most programs do not actually call their degree programs “Human Factors”; instead they often offer a human factors focus under some larger umbrella. Examples of significant current (or past) Human Factors programs include:

- **Georgia Tech** offers a degree in *Engineering Psychology* through the School of Psychology. However, Engineering Psychology programs do not necessarily place strong emphasis on the design, engineering design, or physical ergonomics that are an important part of Human Factors. Georgia Tech has also offered a track in the MS/PhD in Industrial and Systems Engineering that is titled, "*Human-Integrated Systems*." This program track has traditionally operated with a single disciplinary in focus, placing very heavy emphasis on modeling and simulation of human-system behavior as opposed to delivering well-rounded training in core human factors competencies.
University of Toronto, the Mechanical and Industrial Engineering Department offers an MS in Design and Manufacturing, and a PhD program in Mechanical and Industrial Engineering, both of which can include a focus on Human Factors courses.

Purdue University offers an MS and PhD in Industrial Engineering, which can be given a Human Factors focus. [https://engineering.purdue.edu/IE/](https://engineering.purdue.edu/IE/)

Embry-Riddle Aeronautical University offers a Masters of Science in Human Factors and Systems, with tracks in Human Factors, and Systems (but no PhD in this Human Factors). This Human factors program has a focus primarily limited to Aviation applications. [http://www.erau.edu/db/degrees/ma-humanfactors.html](http://www.erau.edu/db/degrees/ma-humanfactors.html)

University of Wisconsin, the Industrial & Systems Engineering (ISyE) Department offers an MS in “Human Factors and Ergonomics” and a PhD in ISyE which can be given a Human Factors focus. [http://www.engr.wisc.edu/ie/prospective/grad/](http://www.engr.wisc.edu/ie/prospective/grad/)

University of Illinois offers an interdisciplinary MS program in “Human Factors” with courses drawn from Psychology, Aviation, and Computer Science. They do not offer a separate Human Factors PhD, but students can add a concentration of human factors course work while competing PhD degrees in the aforementioned departments. [http://www.humanfactors.illinois.edu/about/](http://www.humanfactors.illinois.edu/about/)

Yet other universities, such at George Mason University, offer a “Human Factors and Applied Cognition” (HFAC) MA and PhD, under the Department of Psychology. [http://www.hfac.gmu.edu/graduate_programs/masters/masters.shtml](http://www.hfac.gmu.edu/graduate_programs/masters/masters.shtml). A more complete list of Human Factors programs in the U.S. and Canada is included in Appendix II.

Of the programs above, Illinois’ interdisciplinary program most closely resembles the program we are proposing. However, they do not offer a PhD -- and we will.

There are several issues worth noting. First, there are relatively few programs that focus on Human Factors at major research universities (or other institutions). This is not because there is little need for Human Factors. In fact, the industry letters of support attached to this proposal strongly indicate that it is difficult to fill the need for people with Human Factors expertise. Instead, the small number of programs is more a reflection of the fact that Human Factors applications are very broad and faculty researchers with a Human Factors focus are often scattered across many departments and colleges, making it difficult to support programs with a Human Factors focus within any one department. Indeed, even departments with relatively large numbers of Human Factors faculty have less than 10 human factors faculty, for example Wisconsin has 9, Toronto, 6 and Purdue, 6. Most have fewer in any given department, usually 1 to 3, even if they have 10 or more across the organization as a whole.

Second, given that the majority of department-based programs with a Human Factors focus typically have only a few Human Factors faculty with homes in that department, they can be quite vulnerable to the departure of one or two key faculty members. For example, in the early 1990’s there was a fairly strong Human Factors-oriented program within the Mechanical and Industrial Engineering department (now renamed), at the University of Illinois. However, the departure of 3 key Human Factors faculty in the late 1990’s within a very short time, caused the end of that program in that form.
Third, it is difficult for a single department to regularly offer the diverse courses that give Human Factors its richness, nor is it really necessary for a single department to do so given the wealth of human factors relevant courses available at the university.

Thus, while interdisciplinary MS and PhD programs bring their own set of challenges which should not to be underestimated, they have the potential for more stability than a department-based human factors program. This is because they draw on a broader set of human faculty, and courses, from across the university rather than depending on continued employment of a few, situated in a single department.

The unique properties of the proposed Human Factors graduate program are the combination of design and engineering design, coupled with the combination of both physical and cognitive ergonomics, and unified with a methodological focus on human-centered systems design.

**Why a Human-Centered Focus?**

The MS/PhD in Human Factors at the University of Minnesota will offer a human-centered systems approach to human factors. In this context, the “system” is viewed as the combination of the human(s), technology, processes, and organization(s); all must interact seamlessly. One cannot simply design a technical artifact without understanding the human-centered system within which it will function. Consideration of human abilities, needs, and tasks that must be supported technology are central to this approach. Additionally, consideration of how human organizations will implement the technical artifact and/or process is essential as well (e.g., new training, responsibilities, reporting structures, and documentation). The University of Minnesota Human Factors MS/PhD graduate program will teach students how to design human-centered systems that facilitate effectiveness, health, safety, and well-being of the people who are served by these systems.

**History at Minnesota: Human Factors and Graduate Education**

**Graduate Minor Program in Human Factors and Ergonomics.** Much of the groundwork for a Human Factors graduate degree program has already been laid through the establishment and revision of the Human Factors Graduate Minor program. This minor program was established approximately 15 years ago, and was revised in January 2007 to increase its interdisciplinary appeal when its administrative home was moved from The College of Education and Human Development to the Institute of Technology. The move was made, in part, to facilitate synergies between Human Factors and its application in engineering design. The 2007 revisions of the Human Factors Graduate Minor Program have been successful in increasing the interdisciplinary appeal of the program and synergies with engineering design. However, for graduate students whose primary research interest is Human Factors, particularly PhD students, it has become increasingly difficult for many of these students to find an appropriate major program home that permits sufficient focus on their educational needs. This increasing difficulty has resulted, in part from focus changes in many programs, and an increase in the breadth of applications to which Human Factors is now applied.
Changes in graduate education programs. Changes in several programs over the past 10 or more years, have contributed to the need for a Human Factors Masters/PhD program. A decade ago, many human factors oriented graduate students majored in Industrial Engineering at the University of Minnesota. However, around 2000, the Industrial Engineering program made an explicit decision to focus on Operations Research (one of several areas traditionally included in Industrial Engineering) in response to recommendations made by an external review committee. The reasoning behind the recommendations was that, given the limited resources of the Industrial Engineering program, they should focus on one area; and given that the majority of faculty specialized in Operations Research, it was recommended that Operations Research should be the area of focus. Similarly, Kinesiology, which has also been a traditional home at University of Minnesota for many Human Factors students, has deemphasized Human Factors in recent years.

While this may have been an appropriate strategic decision for Industrial Engineering, it has left an educational gap for many graduate students primarily interested in Human Factors. Additionally, since 2000, interest in Human Factors has greatly increased in the College of Design, the School of Public Health, and in Writing Studies (College of Liberal Arts). This is due to the need for increasingly technologically sophisticated buildings, medical devices, health systems, and documentation to explain those systems. However, no single college is home to many Human Factors faculty. Thus, there is a growing need for Human Factors training that crosses many disciplines and colleges across the University.

a. Student interest and perspective enrollment. The proposers, Hayes and Harder, each receive 15 – 20 inquiry’s each year from students wishing to earn graduate degrees in Human Factors, not just a minor (See student letters in Appendix I). This has been the case particularly during the economic downturn of the past year; people who have been laid-off from jobs in industry are looking to return to the university for additional graduate training. Many potential students with industry experience are explicitly interested in Human Factors because they have recognized the great need for Human Factors through their work.

Currently, graduate students wishing to specialize in Human Factors must do so by taking a concentration of courses or a minor in Human Factors, and majoring in some other related discipline such as Psychology, Cognitive Science, Industrial Engineering, Kinesiology, or Design. While this works for some students, many have expressed great dissatisfaction with this arrangement, finding that all of these programs require too much concentration in areas outside their interest with insufficient time to focus on their real interest of Human Factors.

A number of graduate students have become discouraged for all the reasons above, and failed to complete their degrees, while other perspective graduate students with a primary interest in Human Factors have failed to come to the University of Minnesota, even when full financial support was offered, because of the lack of a Human Factors degree program (see letter below). Others choose other Universities in the region that do have Human Factors programs such as University of Wisconsin and Iowa State.

At steady state we expect to have approximately 16 - 20 students at various stages of degree completion. If we admit 4 – 5 industry supported MS students per year, and 2 – 3 PhD students per year (as research support within Human Factors research laboratories
permits, then we can expect between 8 and 10 MS students at steady state, if it takes them 2 years or less to complete their degrees; and approximately 8 – 10 PhDs if it takes them 3 – 5 years to complete their degrees (3 years if entering with an MS, 5 years if entering with only an undergraduate degree). It is not expected to be a large program, but it fills an important gap.

b. Employment opportunities. Examples of employers in the area with an interest in hiring people with degrees and training in human factors include Honeywell, which has two Human Factors oriented divisions; health care providers such as Fairview Health Services, Allina Hospitals and Clinics, Health Partners; the biomedical manufacturers including Medtronic, St. Jude, etc.; manufacturing companies such as 3M, and defense and aviation: Lockheed Martin and Smart Information Flow Technologies. There are also many national and international employment opportunities. In addition to the areas above, including the Federal Aviation Administration, NASA, Booz-Allen Hamilton; the military and military research organizations at Army Research Laboratory, Wright Patterson Air Force Base, USAF Rome Labs. There is a long-term shortage of Human Factors professionals in industry as indicated in the letters of support from industry in the Appendices.

c. Faculty support. The initiative for a Human Factors degree program came from needs expressed by students (not being able to find a program that fit their focus), industry (the need for high quality, well trained human factors interns graduates) and faculty (including frustration at not being able to find appropriate students for work on grants) and from requests from students.

The Human Factors program does not, and will not have its own faculty lines. Faculty are drawn from several colleges: Institute of Technology, College of Design, and College of Education and Human Development. A list of MS/PhD Human Factors program faculty are included in the appendices along with letters of support from those faculty. The Human Factors MS/PhD program faculty are a subset of the Human Factors Graduate Minor program faculty. The bar for membership in the MS/PhD program faculty is much higher; the senior members (SM) must have their main research area in human factors and be either on a research appointment or a tenured/tenure track appointment at the University of Minnesota; the member/advising faculty must have strong human factors facets to their work, and may be hold lecturer, research or tenured/tenure track appointments.

d. Societal benefit. The societal benefits are to provide education which will enable graduates to assist in increasing the health, effectiveness, safety and well-being of our citizens. The program will also fill an unmet interdisciplinary educational need at the University of Minnesota for students, faculty and industry; support the university’s research mission, and provide catalyst for interactions with many existing programs across several colleges.

Lack of Duplication

Contrast to the Cognitive Science Program. The goals and foci of these the Cognitive Science and Human Factors programs are quite different. The Cognitive Science Program (as stated on their website) is concerned with humans and intelligence whether in people or simulated on a machine. As stated on their website, Cognitive Science is about "the acquisition, representation, and use of knowledge by humans and
machines." In contrast, the focus of Human Factors program is on the interaction between people and technology; and designing socio-technical systems to maximize system effectiveness, safety and well-being.

There is some subject matter overlap between the fields of Human Factors and Cognitive Science, in that an understanding of Cognitive Science provides an understanding of the “human” side of Human Factors, but places less emphasis on the technical or human-centered systems aspects.

**Contrast to the New Product Design minor.** This program is complementary to the Human Factors Masters/PhD program. A student working on a masters or PhD in Human Factors could also add one of these minors.

Development of a “Product Design” graduate program is currently underway, under the direction of professors Durfee (Mechanical Engineering, Institute of Technology) and LaBat (Design, Housing and Apparel, College of Design). This program will be an interdisciplinary, intercollegiate collaboration between the College of Design, the Institute of Technology and the Business School. It will involve a post-baccalaureate certificate program in “Product Design,” and a minor in “Design Thinking.” The focus of this program will be to give students a combined understanding of the design, engineering and business perspectives needed for successful design, development and marketing of new products.

The proposed Human/Factors Masters/PhD program differs from the Product Design program in several ways. First, the proposed Human Factors program will be a full-fledged graduate program aimed at students interested in Masters and PhD degrees, not certificates or minors. Second, the aims of these programs are quite distinct. Product Design focuses on the end-to-end process of designing and marketing a new product, while Human Factors focuses far more broadly on understanding, evaluating and designing effective interactions between people and technology. Students interested in these two degree programs will have very different goals and needs.

**Synergistic Impact.** However, we view the relationship between all 3 of these programs: Human Factors, Cognitive Science and Product Design as complementary and synergistic. For example, some students may wish to major in Human Factors, but take a minor in Design Thinking or Cognitive Science. Similarly, majors in Cognitive Science may wish to take a minor in Human Factors. All 3 programs will benefit from the organization of a Human Factors graduate program, and their appeal for incoming students will be strengthened by the presence of additional related educations options, and a larger community of related researchers.

**Primary Competition Outside University of Minnesota**

University of Illinois

University of Wisconsin

University of Toronto

Purdue University

While there are no U.S. News and World Report rankings published for human factors programs, these programs are all excellent, and are the first programs that typically come to mind when people think of Human Factors. All are located at major research universities. The program at University of Wisconsin is the largest. The program at Embry Riddle which we mentioned earlier, while well known, is not comparable to those above when considering PhD programs, as it is not an R1 research university, and the focus of the university is aviation, thus a much narrower spectrum of courses are offered.
The proposed program at Minnesota will fill a different niche than the programs above, which are mostly based in specific departments (Industrial or Mechanical Engineering) with the exception of the program at Illinois, which is an interdisciplinary MS that is not based in one department. The proposed Human Factors MS/PhD program for University of Minnesota, differs from these in that it includes a strong design focus (from both the college of design and engineering design perspectives), and an emphasis on human-centered systems as a unifying design methodology for both cognitive and physical ergonomics, and the many discipline-based applications of human factors.

Human factors, as it is practiced, is truly interdisciplinary because of the broad range of disciplinary applications in which it is grounded. However, human factors educational programs tend to be centered in specific departments, and those programs become narrow over time, loosing their interdisciplinary richness of perspectives.

The Minnesota program will be unique in the country in that it will

1) Offer a Human Factors PhD (in addition to the MS),
2) Offer true interdisciplinary, spanning multiple colleges and departments, including the College of Design (a perspective rarely, if ever, included in Human Factors programs), thus offering students the opportunity to immerse themselves in the full richness of a range of disciplinary perspectives, and
3) Provide a unifying human-centered systems approach.

**Targeted Audience Details**

**PhD.** We expect that most of the Human Factors PhD students will be either full-time students, or full or part-time research staff in the various human factors research labs. The full-time students passing admissions criteria will be reviewed by the human factors MS/PhD program faculty to be considered for Research Assistantships from the human factors program faculty.

**MS Plan A.** We do not plan to admit students in the MS Plan A track; the function of this track is to provide an exit strategy for those students who do not continue in the PhD track.

**MS Plan C.** We expect that most of the Human Factors MS Plan C students may continue to work in local industry while they earn their degrees. We do not plan to offer support to these students. Additionally, this track can offer an additional exit strategy for PhD students leaving the program without a PhD. While the current economic climate may have temporarily cooled many industries’ enthusiasm to pay for their employees’ masters degrees, we expect that this situation will change once the economy picks up again.

We expect students will come from a variety of design, engineering, computing and psychology backgrounds, and have research interests in a wide range of applications such as the design of:

- Protective clothing for hazardous environments,
- Effective living and workspaces,
- Intelligent homes and appliances to assist the elderly and allow them to live independently for longer periods of time.
- Safe and effective work environments.
- Easy to understand webpages,
• Easy to understand documentation for product use,
• Safe and effective surgical procedures,
• Safe, usable, wearable and implantable bio-medical devices,
• Usable and safe farm machinery,
• Intelligent computer programs to assist space mission planners in rapidly planning the daily operations of the Mars rovers,
• Intelligent highway signs, and cars,
• Robotic appendages and computer-facilitated communication tools for the handicapped.

Program Needs Identified by Faculty

A need identified by all faculty on the curriculum committee, regardless of department, was the need for more training in experimental design (to assess the effectiveness of solutions created with respect to human factors) and statistical analysis (to analyze and interpret data gathered in assessments.) We addressed this first need by adding a statistics requirement as described below.

An additional need expressed by some faculty was to provide human factors students with training from multiple departments in order to obtain the breadth of knowledge required to understand human factors issues. Human factors always involves the interaction of people and artifacts or systems. However, departments tend to focus on disciplines which address either people or artifacts and systems, but rarely interaction of the two. For example, humans and their physical, cognitive, social and organizational properties are studied by the Medical School, Psychology, Sociology and Carlson School, respectively. Artifacts, systems and their design are studied by the departments in the Institute of Technology and in the College of Design. Students whose homes are in one of these departments tend to have little training outside of it. For instance, students from Kinesiology may know much about the human body and how people move, but less about the artifacts and machines with which they interact. Similarly, Mechanical Engineering students tend to know much about mechanical systems, and less about how people interact with those machines.

Faculty Vote on Proposal

The Human Factors MS/PhD program faculty met face-to-face twice to discuss the proposal and curriculum; once on Thursday, March 4th, 2010 and once on Thursday, March 11th, 2010. After all changes based on discussions were incorporated, the proposal was circulated to all faculty for an e-mail vote. The vote took place between March 12th and March 18th. Thirteen of the 14 faculty responded, 12 voted yes, and one voted yes conditional on meeting all the requirements for program accreditation.

Note: the faculty did discuss accreditation and the requirements of the Human Factors and Ergonomics Society (HFES) for accreditation. The consensus arrived at two points: 1. accreditation is not a priority for the goals of this graduate program, although it would be a positive, and 2. the current curriculum may meet HFES accreditation requirements, a closer look at the writing and teamwork content of the courses is needed to establish this. This is something that the faculty may want to do in the future once the program is underway, but not at this time.
Degree Requirements

A major challenge in constructing an MS Plan A and Plan C, for any interdisciplinary program in which courses are drawn from many colleges, is how to address the requirement for major credits (e.g. course credits using a program course designator such as HUMF). Instructors and deans in colleges outside the home college are extremely hesitant to cross-list their courses with a designator from outside their college, such as the HUMF designator, since it results in a flow of tuition outside their college, even if small. However, the whole point of an interdisciplinary degree is to construct a “core” from courses in many departments or colleges. Thus, it is difficult to simultaneously achieve cross-college interdisciplinarity, and get participating departments and colleges to use a common program designator.

The “major credit” issue does not apply to the PhD directly, since credit requirements are more flexible for the PhD. However, one must still have an MS program as some type in conjunction with a PhD program as a necessary exit strategy for students who are unable to complete the PhD.

As an alternative to “major field” credits which use the HUMF designator, we propose MS Plan A and C students take a certain number of credits from the “Human Factors” list in the appendices. These courses have are currently part of the Human Factors graduate minor program.

Minors. Interdisciplinary programs can apply to waive the requirement for a minor. We wish to do so for the PhD and MS Plan A option (but not the MS plan C as these students do not have the thesis requirement). We want PhD and MS Plan A students to be able to focus on the human factors core, which requires that students take courses in at least 3 departments. Thus, they will already be required to achieve much the disciplinary breadth that a minor would give them. Additionally, the

However, some students may wish to take a minor for professional credentials. For these students we they may add a minor to their degree programs below. For the PhD with a minor this will require students complete 50 credits (14 major, 12 minor, and 24 thesis credits), for MS Plan A students with a minor, students must complete 30 credits (14 major, 6 minor, and 10 thesis credits).

Proposed Requirements for a Human Factors PhD Degree (without a minor)

Total credit hours: 42

Major Course Requirements: 14 credits total from the core, including:

- 3 credits in statistics or experimental design,
- 3 credits in Human Factors Foundations,
- 3 credits in Physical Human Factors,
- 3 credits in Cognitive Human Factors.

The balance of core credits may come from any category on the core list. Furthermore, in order to insure that students receive interdisciplinary exposure to multiple perspectives, they must choose core courses (excluding statistics and experimental design courses) from at least 3 different departments.

Responsible research conduct/professional ethics requirement. Students must complete a non-credit “Research Ethics and Professional Conduct” experiences.
Thesis credits. 24 thesis credits.
Specification of examinations, papers, thesis. Current graduate school policies regarding doctoral examinations and dissertations apply.
Examining committee composition: three faculty from the Human Factors MS/PhD program faculty, these faculty must be chosen from at least 2 different departments to insure an interdisciplinary perspective.

Proposed Requirements for a Human Factors Master of Science, Plan A Degree (without minor)

Total credit hours: 30.
Major Course Requirements: 14 credits total from the core; including:
- 3 credits in statistics or experimental design,
- 3 credits in Human Factors Foundations,
- 3 credits in Physical Human Factors,
- 3 credits in Cognitive Human Factors.

The balance of core credits may come from any category on the core list. Furthermore, in order to insure that students receive interdisciplinary exposure to multiple perspectives, they must choose core courses (excluding statistics and experimental design courses) from at least 3 different departments.

Responsible research conduct/professional ethics requirement. Students must complete a non-credit “Research Ethics and Professional Conduct” experiences.

Thesis credits: 10 thesis credits.
Examining committee composition. Two faculty from the Human Factors MS/PhD program faculty, and one from a minor or related field.
Final Exam will be an oral defense of the students’ thesis work.

Proposed Requirements for a Human Factors Master of Science, Plan C Degree (with minor, but no thesis)

Total credit hours: 30.
Major course requirements: 14 credits total from the core, including:
- 3 credits in statistics or experimental design,
- 3 credits in Human Factors Foundations,
- 3 credits in Physical Human Factors,
- 3 credits in Cognitive Human Factors.

The balance of core credits may come from any category on the core list. Furthermore, in order to insure that students receive interdisciplinary exposure to multiple perspectives, they must choose core courses (excluding statistics and experimental design courses) from at least 3 different departments.

Minor course requirements: 6 “non-major” credits, e.g. from outside the “Human Factors Core” list.

Responsible research conduct/professional ethics requirement. Students must complete a non-credit “Research Ethics and Professional Conduct” experiences.

Proposed Human Factors Core Courses
(Some courses are listed in multiple categories)
• All students (MS and PhD) must take at least one course from the Human Factors Fundamentals, one from the Cognitive Human Factors list, and one from the Physical Human Factors list.
• All students (MS and PhD) must take at least 3 credits from the list of statistical and experimental design courses.
• *Interdisciplinary breadth requirement:* Excluding the statistical and experimental design courses, students must take core courses from at least 3 departments.

**Human Factors Fundamentals**

**Human Factors (and Mechanical Eng)**
- HUMF/ME 5211 (4 cr) *Human Factors and Work Analysis* (Hayes) Internet delivery option, research methods

**Design, Housing and Apparel**
- DHA 5185 (3 cr) *Human Factors in Design*

**Human Factors (and Mechanical Eng)**
- KIN 5001 (3 cr) *Foundations of Human Factors*, (Smith)

**Cognitive Human Factors**

**Computer Science and Engineering**
- CSci 5109 (3 cr) *Visualization* (Interrante)
- CSci 5115 (3 cr) *User Interface Design, Implem. and Eval.* (Konstan/Terveen)
- CSci 8115 (3 cr) *Human Computer Interaction and User Interface Technology.* (Konstan/Terveen) Internet Delivered

**Cognitive Science**
- CgSc 8000 (3 cr) *Philosophy of Cognitive Science*

**Human Factors (and Mechanical Eng)**
- HUMF/ME 8541 (4 cr) *Decision Support Systems* (Hayes) (Research methods).

**Health Informatics**
- HINF 5XXX *Human Factors and Human-Computer Interaction in Health Informatics* (new course – course number to be determined in several weeks).

**Kinesiology Human Factors**
- KIN 5722 (3 cr) *Human Factors Psychology* (Stoffregen)

**Psychology**
- PSY 5031W (3 cr) *Perception* (WI)
- PSY 5037 (3 cr) *Psychology of Hearing*
- PSY 5015 (3 cr) *Cognition, Computation, and Brain*
- PSY 5051W (3 cr) *Psychology of Human-Machine Interaction* (WI)

**Writing Studies**
- WRIT 4501 (3 cr) *Human Factors and Usability in Technical Comm.* (offered evenings, research methods)

**Physical Human Factors**

**Biosystems and Agricultural Engineering**
- BAE 5212 (3 cr) *Safety and Environmental Health Issues in Plant and Animal Production and Processing.*

**Human Factors (and Mechanical Eng)**
- HUMF/ME 5211 (4 cr) *Human Factors and Work Analysis* (Hayes) Internet delivery option, research methods

**Kinesiology Human Factors**
- KIN 4135 *Human Motor Control and Learning*
KIN 5132  (3 cr)  Motor development  
KIN 5505  (3 cr)  Human centered design, principles and applications (Smith)  
KIN 8211  (3 – 6 cr)  Seminar: Motor Control and Learning  
KIN 8211  (3 cr)  Perception and Action (Stoffregen)  

**Industrial and Systems Engineering:**  
IE 5513  (4 cr)  Engineering Safety  (Chaplin, Shutske)  

**Nursing**  
NURS 7118  (3 cr)  Human Factors and Human-Computer Interaction in Health Informatics (internet delivered)  

**Public Health**  
PubH 6120  *Injury Prevention*  

**Macroergonomics**  

**Sociology**  
SOC 8412  *Social Network Analysis: Theory and Methods*  
SOC8490/MGMT8894  *Theories of Organization*  

**Computer Science and Engineering**  
CSci 5125  (3 cr)  Social and Collaborative Computing  
CSci 8125  (3 cr)  *The Social Web*  

**Information and Decision Sciences (Carlson School of Management)**  
IDSc 8711  (4 cr)  Cognitive Science (Johnson)  
IDSc 8712  (2 cr)  Behavioral Decision Theory  
IDSc 8722  (2 cr)  Heuristic Decision Making  

**Psychology**  
PSY 5501  (3 cr)  *Vocational and Occupational Health Psychology*  
PSY 5708  (3 cr)  Organizational Psychology  
PSY 8201  (3 cr)  Social Cognition  

**Pre-approved Statistics and Experimental Design Courses**  
IE 4521 (4 cr)  *Statistics, Quality and Reliability*  
STAT 5021  (4 cr)  Statistical Analysis  
PUBH 6450  (4 cr)  Biostatistics I  
PUBH 6451  (4 cr)  Biostatistics II  
PUBH 6470  *SAS Procedures and Data Analysis*  
PUBH 7406  (3 cr)  Biostatistics: Design & ANOVA  
STAT 5303  (4 cr)  Designing Experiments  
PUBH 6140  (2 cr)  Occupational and Environmental Epidemiology  
PUBH 6341  *Epidemiologic Methods I*  
PUBH 6342  (3 cr)  Epidemiologic Methods II  
PUBH 6343  *Epidemiologic Methods III*  
PUBH 6806  (2 cr)  Principles of Public Health Research  
PSY 8815-001  (4 cr)  *Analysis of Psychology Data*  

**Seminars**  (not required, but may be of interest to Human Factors Students)  
HUMF 8001  (2 – 3 cr)  *Special Topics in Human Factors/Ergonomics*  
HUMF 8002  (1 cr)  Proseminar in Human Factors/Ergonomic  
CgSc 8001  (2 cr)  Proseminar in Cognitive Science (Randy Fletcher)  
CgSc 8360  (1-3 cr)  Seminar: Topics in Cognitive Science  
IDSc 8892  (1-8 cr)  *Readings in Information and Decision*
Existing Human Factors and Ergonomics Minor for Non-majors.
The Human Factors and Ergonomics minor program is already in place and working well; we do not propose to change it at this time. The groundwork developed through this program has provided a base for the proposed Human Factors MS/PhD graduate program.

Anticipated Timing for Completing Successive Stages of the Program

Selecting an advisor. An advisor should be selected as soon as possible, and no later than the end of the first semester of full-time registration, or the second semester of part-time registration.

Filing degree program with the Graduate School. A degree form should be filed after completing 10 credits. However, students will be encouraged to submit program plans as soon as possible after starting the program since doing so facilitates planning which will help the student think more strategically from an early point in their program.

Preliminary written and oral examination for the PhD. For students who enter with a Masters degree, these exams should be taken before the end of the third semester after admission to the program. For students who enter with out a Masters, these exams should be taken by the end of the fifth semester after admission.

Final written and oral examination for the MS Plan A and PhD will be scheduled for the students final semester in which all degree credit requirements are completed (not required for MS Plan C). For PhDs, the final written and oral exam must be scheduled within 5 years after passing the preliminary oral exam. Students who are unable to complete the degree within the five-year limit may petition the Graduate School for an extension of up to one additional year.

Faculty and Staff

DGS selection. The DGS will be selected for a term of 3 years by a vote of the Human Factors MS/PhD graduate program faculty.

Faculty list. See appendices for a list of faculty, and letters of support from faculty.

Criteria for appointment and continuation of faculty. New faculty will be nominated by existing Human Factors MS/PhD graduate faculty, and voted on by the same for five year terms. Voting may be done either in a meeting of the faculty or by email vote. Renewal will be conducted by the same process. Appointment criteria will be those of the Engineering, Physics and Mathematical P&R Council.

Meetings of the faculty. The HF MS/PHD graduate faculty will meet once a year, or as needed. An appointed sub-committee will meet to review graduate applications in the spring and fall.

Faculty lines. Faculty lines are not anticipated.

Staff. Minimal time from a DGS assistant is needed to process graduate applications, and minimal time from a web maintainer to update the program webpage. (See Kortshagen’s letter of support).

Student Procedures

Recruitment. Student recruitment will be done through the HF MS/PhD graduate program website, listings on professional society websites (such as the Human Factors and Ergonomics Society), and materials distributed to local companies with
human factors interests. We will also hand out promotional materials to the DGSs in the Institute of Technology and the College of Design to give to interested undergraduates.

Admission requirements. Entering students must hold a bachelor’s degree, have high grades and high GREs. Specific requirements for grades, GRE, TOEFL and IELTS will be discussed at the February, 2010 meeting of the HF MS/PhD graduate program faculty. Because of the interdisciplinary nature of Human Factors, we expect students to come from a broad range of backgrounds, so we will not require that they enter with specific type of bachelor’s degree. Based on student inquires and career goals (see student letters in the appendices), we expect to see applicants from with Bachelors in engineering, design, science including the medical sciences, writing and journalism studies. For those from the less technical degrees, we will look for those with a strong technical interest. For example, if an English Major applies, we would look for course work in technical areas such as programming, or work experience in User Interface or Interaction design.

Financial support. MS Plan C students will not typically be supported through the HF MS/PhD graduate program. These students will be expected to provide their own support or, for those who are working, to arrange tuition support through their company. We will make this very clear on the website and in the acceptance letters.

Support for PhDs will come primarily from the Human Factors graduate faculty grants and research laboratories at the University of Minnesota on an as-available basis. Notably, research funding in the HF area at UMN has been strong even though the economic down-turn (for example, Harder, Hayes, Manser, Stoffregan and others each have multiple current grants). Additionally, there will likely be some PhDs who are working part or full-time in industry who will receive tuition support from their companies, while working on their PhDs on a part-time basis. We will not admit PhDs whom we do not feel can be supported through one source or another for the duration of a PhD. Additionally, we will apply for more funds for general support of Human Factors PhDs through a “Training Grant” from the Department of Education. Such grants support up to 6 students to seed new graduate programs. However, while such a grant would be very helpful, it is not essential, given the Human Factors research funding available at UMN as described above.

We do not plan on supporting Masters Students under most circumstances. We will make this clear on the website. We anticipate that many of these students will be employed in industry, and seeking to enhance their job skills. Tuition for these students will either be paid by their companies, or the students themselves.

Diversity. Human Factors is an area which seems to naturally attract a diverse range of students. The current students and past students in the minor program have been diverse in race, gender, national origin, background, and ideas. We expect the masters and PhD students to be equally diverse, and we expect this diversity will foster creativity though a diversity of approaches and ideas.

Timing Issues

Term and year the program will first be offered. Spring, 2010.

Anticipated growth over initial years. We anticipate 2 to 4 PhD students to enter the program per year, and 5 or 6 Masters. At steady state, we expect approximately 20 - 30 enrolled students at various stages of degree completion.
Timeline for becoming fully operational. We expect to start reviewing students as soon as the program is approved. In Summer 2010 we will consider transfers of existing students. We expect the first class of external students to apply in Fall 2010 and enter in Spring 2011. We expect it to take roughly 5 years before the PhD students have advanced sufficiently to allow the program to reach steady state.

First review. There will be a review of the program after the first full two years of operation (Fall 2013). This will involve a meeting of the program faculty, college and Graduate School deans. The program faculty will provide all the necessary and appropriate data for this review.

Exist strategy. If after the first review, the program is not deemed viable, existing students will be allowed to complete their planned degrees, but no new students will be allowed to enter. It will not be a problem for these students to fulfill their course requirements since the majority of classes are not specific to the Human Factors program, and those that are must also be offered for the HF minor. Our main action will be simply to cease admissions, and mentor the remaining students to completion. The faculty will not be disbanded, as they will still exist as a faculty as long as the HF minor program continues; therefore they will still be available to sit on thesis exams and committees.

Internet Support for Finding Course Offerings
One of the challenges of running an interdisciplinary program that we have learned from the Human Factors and Ergonomics Minor is that it is difficult for the DGS and students to identify all the course offerings that apply to the program, given that they come from multiple departments. They must look through many course lists from many departments to find the one that apply to the Human Factors program; finding the course offerings is much more difficult for students in an interdisciplinary program than for those where most of the courses are drawn from one department. To address this problem, one of Dr. Hayes’ students, Xiao Dong, has written a computer program that will accept a list of courses, link to the university course database, look up all courses in the curriculum, and print the ones that are offered in the current or coming semester in a concise webpage form. The program is currently in the beta test phase, but we hope it will be big help to students, as well as an example of an application of Human Factors that uses technology to address a human challenge.
Appendix I: Letters of support from Faculty, Administrators, Industry, and Potential Students

Below is a table of contents for Appendix I

Appendix I.A: Letters from Faculty

Institute of Technology:
- Caroline Hayes, Mechanical Engineering, SM
- Mike Manser, Mechanical Engineering, SM
- Will Durfee, Mechanical Engineering, AM
- Victoria Interrante, Computer Science, SM
- Loren Terveen, Computer Science, SM
- Joseph Konstan, Computer Science, AM

College of Design
- Kathleen Harder, Center for Design in Health, SM
- Karen LaBat, Department of Design, Housing and Apparel, M
- Lucy Dunne, Department of Design, Housing and Apparel, SM

College of Education and Human Development
- Thomas Stoffregan, Kinesiology, SM
- Michael Wade, Kinesiology, SM
- Thomas Smith, Kinesiology, AM
- Herbert Pick, at the Institute of Child Development, SM

College of Liberal Arts
- Lee-Ann K. Breuch, M

Appendix I.B: Letters from administrators:

Department heads
- Uwe Kortshagen, Head, Mechanical Engineering (still awaiting letter)
- Vipin Kumar, Head, Computer Science
- Rebecca Yust, Head, Department of Design, Housing and Apparel
- Laura Gurak, Chair, Department of Writing Studies
- Head, School of Kinesiology (still awaiting letter)

Deans
- Thomas Fisher, Dean, College of Design
- Steven Crouch, Dean, Institute of Technology (still awaiting letter)
- Jean Quam, Dean, College of Education and Human Development (still awaiting letter)
- James Parente, Dean, College of Liberal Arts (still awaiting letter)

Appendix I.C Letters from Industry
- Medtronic
- Lockheed Martin
- Veterans Administration
- Mayo Clinic
- 2 letters from Honeywell

Appendix I.D Letters from potential students
February 3, 2010

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to

- serve as the director of graduate studies for the program;
- serve as the major advisor for program graduate students, including directing Plan B papers, Master’s theses, and/or doctoral dissertations, as appropriate for this program;
- serve as the co-advisor for program graduate students;
- serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student’s thesis, and participating in the defense of a student’s thesis;
- evaluate preliminary written exams that were submitted to the graduate program;
- organize an 8xxx graduate seminar in the program or teach a program graduate course;
- serve on seminars or discussions on topics related to the professional development of program students;
- participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;
- participate in the recruitment of program students.
Sincerely,

[Signature]

Caroline Hayes  
Professor of Mechanical Engineering
February 1, 2010

Michael P. Manser  
Director, HumanFIRST Program  
ITS Institute  
1100 ME, 111 Church Street SE  
University of Minnesota  
Minneapolis, MN 55455  

The Graduate School  
302A Johnston Hall  
University of Minnesota  
101 Pleasant Street S.E.  
Minneapolis, MN 55455

Dear Dr. Garner,

I strongly support the proposed *Human Factors and Ergonomics* graduate program. This interdisciplinary program would fill a vital gap in the current programs at University of Minnesota, providing education to address the interplay between humans and technology. This is an area that is of great interest and need within local and national industry, but which is not currently covered by any University of Minnesota program, or indeed by any program in Minnesota. I am happy to serve as a member of the graduate faculty for this program.

Sincerely,

Michael P. Manser
February 2, 2010

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School, 302A Johnston Hall
University of Minnesota, 101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Henning,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. When appropriate, I agree to:

☒ serve as the major advisor for program graduate students, including directing Plan B papers, Master’s theses, and/or doctoral dissertations, as appropriate for this program;

☒ serve as the co-advisor for program graduate students;

☒ serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student’s thesis, and participating in the defense of a student’s thesis;

☒ evaluate preliminary written exams that were submitted to the graduate program;

☒ organize an 8xxx graduate seminar in the program or teach a program graduate course;

☒ serve on seminars or discussions on topics related to the professional development of program students;

☒ participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;

☒ participate in the recruitment of program students.

Sincerely,

[Signature]

William K. Durfee
Professor and Director of Design Education
February 4, 2000

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to:

☐ serve as the major advisor for program graduate students, including directing Plan B papers, Master's theses, and/or doctoral dissertations, as appropriate for this program;

☐ serve as the co-advisor for program graduate students;

☐ serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student's thesis, and participating in the defense of a student's thesis;

☐ evaluate preliminary written exams that were submitted to the graduate program;

☐ organize an xxxx graduate seminar in the program or teach a program graduate course;

☐ serve on seminars or discussions on topics related to the professional development of program students;

☐ participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;

☐ participate in the recruitment of program students.

Sincerely,

Victoria Intemann
Associate Professor, Department of Computer Science and Engineering
February 2, 2010

Dr. Henning Schroeder  
Vice Provost and Dean of Graduate Education  
The Graduate School  
302A Johnston Hall  
University of Minnesota  
101 Pleasant Street S.E.  
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to

☐ serve as the major advisor for program graduate students, including directing Plan B papers, Master’s theses, and/or doctoral dissertations, as appropriate for this program;

☐ serve as the co-advisor for program graduate students;

☐ serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student’s thesis, and participating in the defense of a student’s thesis;

☐ evaluate preliminary written exams that were submitted to the graduate program;

☐ organize an 8xxx graduate seminar in the program or teach a program graduate course;

☐ serve on seminars or discussions on topics related to the professional development of program students;

☐ participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;

☐ participate in the recruitment of program students.

Sincerely,
Loren Terveen
Professor and Director of Graduate Studies
Department of Computer Science & Engineering
The University of Minnesota
February 3, 2010

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to

- serve as the co-advisor for program graduate students;
- serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student’s thesis, and participating in the defense of a student’s thesis;
- evaluate preliminary written exams that were submitted to the graduate program;
- organize an 8xxx graduate seminar in the program or teach a program graduate course;
- serve on seminars or discussions on topics related to the professional development of program students;
- participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;

Sincerely,

[Signature]
Joseph A. Konstan
Distinguished McKnight Professor and Associate Head
February 4, 2010

Dr. Hearing Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I decline my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to:

- serve as the major advisor for program graduate students, including directing Plan B papers, Master's theses, and/or doctoral dissertations, as appropriate for this program;
- serve in the co-advisory program graduate students;
- serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students; reviewing the final version of a student's thesis; and participating in the defense of a student's thesis;
- evaluate preliminary written exams that were submitted to the graduate program;
- organize an XXXX graduate seminar in the program or teach a program graduate course;
- serve on seminars or discussions on topics related to the professional development of program students;
- participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;
- participate in the recruitment of program students.

Further, I commit to developing a course on conveying the principles of human factors systems design in health care, an approach that has yielded significant reductions in medical errors of various types and better patient care. This course will be beneficial to students working toward a Ph.D. in Human Factors.

Sincerely,

[Signature]

Kathleen A. Harter, Ph.D.
Director
February 2, 2010

Dr. Hamming Schaadter
Vice Provost and Dean of Graduate Education
The Graduate School
307A Jefferson Hall
University of Minnesota
129 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schaadter,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested in appropriate to:

☐ serve as the co-advisor for program graduate students;
☐ serve on advisory/thesis committees of program graduate students, including serving on advisory/thesis committees of program graduate students, reviewing the final versions of a student's thesis, and participating in the defense of a student's thesis;
☐ evaluate preliminary written exams that were submitted to the graduate program;
☐ organize and teach 3xxx graduate seminar in the program or teach a program graduate course;
☐ serve on seminars or discussions on topics related to the professional development of program students;
☐ participate in governance of the program as described in the proposal, including serving on advisory committees for the graduate program and participating in graduate program faculty meetings;
☐ participate in the recruitment of program students.

Sincerely,

Karen L. Laflah
Professor
Department of Human Dimensions
University of Minnesota

Given to Discover
February 2, 2011

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
305A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to

- serve as the major advisor for program graduate students, including advising Plan B papers, Master's theses, and/or doctoral dissertations, as appropriate for this program;
- serve as the co-advisor for program graduate students;
- serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students reviewing the final version of a student's thesis, and participating in the defense of a student's thesis;
- evaluate preliminary written exams that were submitted to the graduate program;
- organize an open graduate seminar in the program or teach a program graduate course;
- serve on student or admissions committees related to the professional development of program students.

I hereby request the following title: [Insert title here].

I am interested in participating in the recruitment of program students.

Sincerely,

[Signature]

[Name]

Assistant Professor

Drive to Discover
College of Education and Human Development

February 4, 2010

Dr. Henning Schroeder  
Vice Provost and Dean of Graduate Education  
The Graduate School  
302A Johnston Hall  
University of Minnesota  
101 Pleasant Street S.E.  
Minneapolis, MN  55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested in all of the following:

☐ serve as the major advisor for program graduate students, including directing Plan B papers, Master’s theses, and/or doctoral dissertations, as appropriate for this program;

☐ serve as the co-advisor for program graduate students;

☐ serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student’s thesis, and participating in the defense of a student’s thesis;

☐ evaluate preliminary written exams that were submitted to the graduate program;

☐ organize an 8xxx graduate seminar in the program or teach a program graduate course;

☐ serve on seminars or discussions on topics related to the professional development of program students;

☐ participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;

☐ participate in the recruitment of program students.

Sincerely,

Thomas A. Stoffregen, Professor, School of Kinesiology
February 2, 2010

Dr. Heining Schoedel
Vice President and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
10, Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schoedel,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to

- serve as the major advisor for program graduate students, including directing Plan B proposals, Master's theses, and/or doctoral dissertation, as appropriate for this program;

- serve as the co-advisor for program graduate students;

- serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student's thesis, and participating in the defense of a student's thesis;

- evaluate preliminary written exams that were submitted to the graduate program;

- organize an annual graduate seminar in the program or teach a program graduate course;

- serve on seminars or discussions on topics related to the professional development of program students;

- participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in governance program faculty meetings;

- participate in the recruitment of program students,

Sincerely,

Michael G. Wade
Professor of Ergonomics,

[Signature]
February 2, 2010

Dr. Henning Schröder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnson Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schröder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested in participating in:

- serve as the major advisor for program graduate students, including directing Plan B papers, Master's theses, and/or doctoral dissertations, as appropriate for this program;
- serve as the co-advisor for program graduate students;
- serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student's thesis, and participating in the defense of a student's thesis;
- evaluate preliminary written exams that were submitted to the graduate program;
- organize an XXX graduate seminar in the program or teach a program graduate course;
- serve on seminars or discussions on topics related to the professional development of program students;
- participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;
- participate in the recruitment of program students.

Sincerely yours,

[Signature]

Herbert L. Pick Jr.
Professor

Driven to Discover
March 12, 2010

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
102A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

With this letter, I declare my commitment to participate as a faculty member in the proposed graduate program in Human Factors and Ergonomics. I understand and agree with the roles and responsibilities assigned to graduate faculty in this program. Specifically, I am interested, if appropriate, to

☐ serve as major advisor for program graduate students, including directing Plan B papers, Master’s theses, and/or doctoral dissertations, as appropriate for this program;

☐ serve as co-advisor for program graduate students;

☒ serve on advisory/thesis committees of program graduate students, including chairing advisory/thesis committees of program graduate students, reviewing the final version of a student’s thesis, and participating in the defense of a student’s thesis;

☐ evaluate preliminary written exams that were submitted to the graduate program;

☒ organize an interdisciplinary seminar in the program or teach a program graduate course;

☒ serve on seminars or discussions on topics related to the professional development of program students;

☒ participate in governance of the program as described in the proposal, including serving on ad hoc committees for the graduate program and participating in graduate program faculty meetings;

☒ participate in the recruitment of program students.

Sincerely,

[Laura Kehlman Breach]
Associate Professor, Department of Writing Studies
Appendix I.B: Letters from Administrators
Department Heads

February 5, 2010

Dr. Harriet Schmoker
Vice Provost and Dean of Graduate Education
The Graduate School
207A Morrill Hall
University of Michigan
400 N. University St.
Ann Arbor, MI 48109

Dear Dr. Schmoker,

I am writing to express my support for Victoria Intemann, Joe Keenan and Loren Tarven's participation as members of the graduate faculty in the new joint College of Design/Institute of Technology Human Factors and Ergonomics MS/PhD program. I understand that their duties may include serving on PhD committees and/or directing PhD research, and that students in the Human Factors program may take their courses. Our department has sufficient teaching capacity in these courses to accommodate the relatively small number of additional Human Factors students expected.

The Human Factors perspective that students will gain from this program will provide them with the ideas and knowledge consistent with the goals of Human Computer Interaction that will facilitate design safe, effective, and usable software that will appeal to people and improve their lives.

Sincerely,

Vipal Kumar
William Norris Professor and Head
Department of Computer Science & Engineering
February 5, 2010

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

I am writing to express my support for the participation of Drs. Karen LaBot and Lucy Durance as members of the graduate faculty in the new joint College of Design/Institute of Technology Human Factors and Ergonomics M.S./Ph.D. program. I understand that they may serve on Ph.D. committees and/or direct Ph.D. research, and that students in the Human Factors program will take their courses. The program will support Dr. LaBot and Dr. Durance’s research by educating students focused on a human factors perspective.

I view this program as a valuable and important addition to the University’s educational portfolio. It is useful to the department in that it will provide students with a perspective on the interplay between designed artifacts (buildings, space, clothing, etc.), people, and their activities. This program will be a welcome addition to the College of Design as a whole for the perspective it offers on the relationship between people and the designed objects and spaces they use and inhabit.

Sincerely,

Rebecca L. Yaster, Ph.D.
Professor and Head, Design, Housing and Apparel

Driven to Discover®
March 12, 2018

Dr. Heenig Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnson Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

I am writing to express my support for Lee-Ann Kastman Breuch’s participation as a member of the graduate faculty graduate faculty in the new joint College of Design/Institute of Technology Human Factors and Ergonomics MS/PhD program. I understand that she will serve on PhD committees and that students in the Human Factors program may take her course WRIT 4501 Usability and Human Factors in Technical Communication.

I view this program as a valuable and important opportunity for Writing Studies to participate in an interdisciplinary degree program in Human Factors. It is useful to the department of Writing Studies in that it will provide students with a perspective on the intersection of technical communication, information design, and usability research on how people interact with texts and computer interfaces. Additionally, the new Human Factors program will support Dr. Breuch’s research by educating students in technical communication and usability. Furthermore, I feel this program will be a welcome opportunity for Dr. Breuch to collaborate with faculty across the university and for the Writing Studies department to pursue interdisciplinary connections related to writing and technology.

Sincerely,

Laura Gurak
Professor and Chair, Writing Studies
Deans

February 2, 2010

Dr. Herbie Schroeder
Vice President and Dean of Graduate Education
The Graduate School
302A Johnson Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

I am writing to express my support of the idea of a Human Factors and Ergonomics graduate program at the University of Minnesota. A number of faculty from across the University do work related to human factors and ergonomics, and yet the University has not done a good a job as other universities in promoting our capabilities in this area to attract the best graduate students to work with faculty doing research in this field as well as to work with the corporations in our region who have a demand for human factors and ergonomics specialists. A graduate program like this would go a long way toward rectifying that situation.

Dr. Kathleen Harder, Karen Laffel, and Lucy Diamond will serve as the graduate faculty from our college who will take the lead in developing the new joint College of Design/Institute of Technology Human Factors and Ergonomics MS/PhD program. I have not seen the proposal yet, nor has our collegiate curriculum committee as far as I know, and as such needs to do more faculty consultation before the program becomes final. I support moving ahead with it in an exploratory way, however, and look forward to working with my colleagues to help make it a reality.

The program's home for the degree will, at least initially, be in Mechanical Engineering, so the program does not have the impact on our staff and resources as it will have on the Institute of Technology. I also understand that the College of Design as well as IT will be the program's joint collegiate home, making it one of several joint programs we have with other colleges, all of which have operated smoothly. I anticipate that this program would be no exception.

Sincerely,

[Signature]

Thomas Fisher
Professor and Dean
College of Design

Driven to Discover
Appendix I.C: Letters of Support from Industry

February 1, 2010

Dr. Hennings Schreuder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schreuder,

I am writing this letter to express my strong support for the proposed Human Factors and Ergonomics graduate program at the University of Minnesota. At Medtronic we have a critical business need for high quality graduates with human factors expertise to help us design, develop, and evaluate medical products and systems. Human Factors as a function is an integral part of the product design and development process at Medtronic. Additionally, the new regulatory requirements that were recently added to the Medical Devices Directive (MDD) has made it imperative that we include human factors work at a system level on all products that go through the regulatory approval process.

Three of the largest Medtronic Business Units that have well established Human Factors departments. The group that I manage is part of the Cardiac Rhythm Disease Management (CRDM) business unit. A critical practice in our group is to have "year-long" interns and we also try to hire "year graduates" (defined as graduates who have not worked on a permanent basis with a company after graduation) as the fiscal environment permits. Most frequently we have filled these positions with graduates from human factors programs across the United States, Canada, and at least one university in the Netherlands. Having a graduate program at the University of Minnesota will make available a pipeline of this skill set locally. We see tremendous value in having a graduate program in the University of Minnesota. It will help fulfill a business need that Medtronic and many companies locally will take advantage of. We will also be able to provide mentoring and applied experience to students of this program (details will need to be discussed).

At Medtronic, we design, develop and produce a wide range of products ranging from handheld surgical tools to devices that are implanted inside the human body. These products need to be developed with the needs, safety and well being of our end users including doctors, nurses, administrators, and patients. We also work with our one-to-one customers to ensure that the products we release fit with their workflow to facilitate acceptance and adoption of the products and to maximize the potential that these capabilities are leveraged by the clients.

We are looking for Human Factors graduates who have exposure to a wide range of human factors topics, including design, engineering, psychology and physical ergonomics. A multidisciplinary program will really help provide these students with the diverse...
background they need to help define and develop safe, easy to use, and cost-effective products that meet and exceed expectations.

We are excited about the prospect of being able to get such graduates locally from a top research university such as the University of Minnesota. Please let me know if you would like more information in this regard or would like to discuss this with me in person.

Sincerely,

[Signature]

Dr. Chaya Gary
Sr. Engineering Manager Human Factors
Cardiac Rhythm Disease Management

611-526-3163
delay@garymedical.com
February 1, 2010

Robert J. Monson, Ph.D.
Lockheed Martin Corp.
3333 Pilot Knob Road
Eagan, Minnesota, 55121

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN  55455

Dear Dr. Schroeder,

Salutations to both you and your organization. I am writing to you to express my strong support the proposed Human Factors and Ergonomics graduate program at the University of Minnesota. I was delighted to hear of this proposed degree program, as I am well aware of the need for these crucial skills in the commercial marketplace.

I have been a practicing engineer for more than 25 years, beginning in the railroad industry, progressing through agriculture, tool and die design, and finally aerospace with Lockheed Martin corporation. Through this very disparate background I have found the one significant skill set that serves an engineer most effectively is a strong foundation in Human Factors. From communicating with others, designing pleasing devices, and developing effective and high-performing project teams, these disparate skills form the very basis of my approach to engineering, and I find them sorely lacking in many new graduates today. I believe a program of this type will serve the community well in preparing the next generation of engineers and managers for the workplace.

I am a strong supporter of a program of this type at the University, and would also like to offer my assistance to support the program in any way you see fit. I would be very willing serve on a curriculum committee, or teach a course in this program in industrial psychology for engineers, if needed. Please feel free to contact me should you have any future need.

Sincerely,

Robert J. Monson, Ph.D.
Lockheed Martin Corp.
3333 Pilot Knob Road
Eagan, Minnesota 55121
(651) 456-2673
February 1, 2010

Dr. Harriquin Schreuder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schreuder,

I am writing to express my strong support for the proposed Human Factors and Ergonomics graduate program at the University of Minnesota, and to describe the workforce need for people trained in Human Factors within the Veterans Administration.

Over the course of the past 10 years, the Veterans Administration has undergone an incredible transformation in efficiency and performance. As the number of returning veterans continues to increase, budget pressures rise, and health care reform progresses, the need for quality, cost-effective patient-centered health care.

Consequently, we have a high need for high-quality graduates trained in Human Factors methods, techniques, and design approaches to carry out the continuing revolution in health care delivery. Human Factors techniques are needed, not only to evaluate and assess the effectiveness of health care systems and processes that are currently in place, but also to improve and radically redesign the approaches to health care.

Human Factors are critical to successful patient-centered health care systems; the patients' safety, satisfaction and comfort are key in creating successful patient-caregiver partnerships that will have positive and long-term health and well-being of the patient. Additionally, Human Factors are key in design of novel healthcare approaches and the technology supporting them, including telemedicine, social networking, and virtual collaboration. The social-technical aspects of such systems are key to acceptance and effectiveness of such systems with patients and caregivers alike.

A Human Factors graduate program will not only support our current research Veteran's Engineering Resource Center (VREC) partnership with the University of Minnesota, we are also continually looking for graduates of excellent Human Factors programs, from top tier research universities such as the University of Minnesota to fill our needs for continuous improvements in health care systems.

Sincerely,

[Signature]

Peter A. Woodbridge, MD, MBA
Director, MidWest Mountain Veterans Engineering Resource Center
February 2, 2010

Dr. Henning Schroeder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnston Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schroeder,

I enthusiastically support the proposed creation of a graduate program at the University of Minnesota in Human Factors and Ergonomics. There is no issue of greater importance today in medicine than the science of health care delivery, and expertise in human factors and ergonomics is critical to advancing this field. Almost a decade ago, the Institute of Medicine identified medical error as a major health problem and yet, over the ensuing years, we have made relatively little progress in this area. It is increasingly clear to those of us who practice clinical medicine on the front lines that the issues related to human factors and ergonomics are first and foremost as both causes of medical error and represent opportunities to prevent the same. Certainly, here at Mayo Clinic, we are in great need of high-quality graduates with human factors expertise. We have a successful track record here at Mayo with publications in this area but find that there are few individuals in the field of human factors and ergonomics who actually have expertise in the medical arena. We have projects slated to be done and no one with the expertise to complete them. An example currently in my own operating room is the need for expertise in this area in developing large-screen displays for the sharing of information regarding surgical procedures to establish common ground and facilitate shared decision-making and mindful engagement. We see tremendous application for individuals with human factors expertise in all areas of our practice, however.

The greatest challenge we face is finding human factors graduates who have an exposure to a wide range of human factors viewpoints including design, systems and cognitive engineering, psychology, and physical ergonomics. I could not be more enthusiastic about the prospect of being able to engage with your school to attract graduates from institutions such as yours. Further, I certainly would enthusiastically embrace any opportunity to work with your program in providing field of opportunities to individuals in such a program. I personally feel that this is an area of tremendous opportunity in medicine and one which you have an outstanding opportunity to make a profound impact. The time is right for such a school to be developed. You have all of the talent and expertise to attract the finest possible candidates and produce the finest possible graduates.

Enthusiastically,

Thorkild M. Sundt, III, M.D.
Professor of Surgery

TMS:bdj
February 3, 2010

Dr. Horning Schreuder
Vice Provost and Dean of Graduate Education
The Graduate School
302A Johnson Hall
University of Minnesota
101 Pleasant Street S.E.
Minneapolis, MN 55455

Dear Dr. Schreuder,

I am writing to express my strong support of the proposed Human Factors and Ergonomics graduate program at the University of Minnesota. Human Factors is the primary focus of two of Honeywell's Research Laboratories, Aerospace Human-Centered Systems and the Knowledge Systems Lab.

In Aerospace, air traffic is expected to more than double by 2020, which will require new technologies to support future collaborative decision making, precision navigation, and drone aircraft operations. Human Factors is at the forefront of the essential empirical needs in these key research areas within the Aerospace industry. The development of Advanced User Interfaces will require novel approaches in advanced symbology, integrated displays, high bandwidth input devices, integrated alerting, remote vehicle control, and cross-cultural interfaces. In the area of Cognitive and Decision Aiding, Human Factors will be the key driver for technologies that result in human workload-reducing features and functions, primarily focused on adaptive user interfaces - tailoring the presentation mode, information content, format, and timing based on the situation and user inputs. Finally, human-centered processes, tools, and metric improvements are critical sources of innovation to increase engineering efficiency and productivity leading to better quality results.

We are very enthusiastic about the prospect of a Human Factors program at the University of Minnesota, as it would provide a source of local talent with human factors expertise, from which we can hire student interns and project interns. In addition, a strong Human Factors program at the University would enhance the collaboration and training possibilities between the University and Honeywell on externally funded programs with sponsors such as DARPA, NASA, and the FAA.

We look forward to this new program which will potentially become a strong partner and provide students with the human factors training that is critical in our business. Please let me know if there is anyway in which I can assist you in making it happen. I can be reached at 763-954-6468.

Sincerely,

Michael Borzych Ph.D.
Senior Research Scientist
Honeywell Laboratories, Human-Centered Systems
February 6, 2010

Dr. Lawrence Schweizer
Vice Provost and Dean of Graduate Education
The Graduate School
120l Johnnson Hall
University of Minnesota
101 Pearson Street S.E.
Minneapolis, MN 55455

Dear Dr. Schweizer,

We are writing to express our strong support for the proposed Human Factors and Ergonomics graduate program at the University of Minnesota and to describe the workforce need for people trained in Human Factors within Honeywell Automation and Control Solutions.

Since 1994 Honeywell has been a technology and manufacturing leader in several areas, including aerospace, control technologies, automotive products and specialty electronics. Honeywell Automation and Control Solutions (ACS) is one of four divisions at Honeywell that designs products to improve everyday life. ACS products are used for improving climate comfort (TVAC), industrial process automation, security surveillance, people and asset tracking, access control, security, fire/gas detection, and home health monitoring systems. A key aspect of ACS success is the need for effective integration between people and technology. Consequently, we have a critical need for high quality graduates trained in Human Factors methods, techniques and design approaches to improve how ACS products deliver value to Honeywell customers. Human Factors techniques are needed not only to evaluate and assess the effectiveness of current ACS products, but also to conduct the fundamental research needed to radically redesign and advance the quality of life of all ACS users.

We believe a technical graduate program in Human Factors is needed to understand the benefits of users that are prevalent in the complex work environments that are supported by ACS products. Most work environments are highly dynamic with distributed work processes, skilled performance, diverse teams, uncertainty, time constraints, high risks, and organizational influences. These systems often involve multiple human-machine interactions. The work environments are also social in that many operations function with a team culture such that activities are managed by crews, shifts, and functional groups. Team members must cope with multiple information sources, conflicting information, rapidly changing scenarios, performance pressures, and high workloads. Therefore, applying a broad understanding of human factors to ACS products in these complex work environments is a key success factor for Honeywell.

A Human Factors graduate program will not only support designing Honeywell's current products but also allow an opportunity for us to identify leading candidates for internships and new positions at ACS. We are continually looking for graduates of excellent Human Factors programs, from top research universities, such as the University of Minnesota, to fill our needs for continued improvements in products and to drive the fundamental research needed to improve the quality of life of all Honeywell customers.

Sincerely,

Brian Lajmiri
Principal Research Scientist
Honeywell ACS Labs
Minneapolis, MN

Yvon Pichette
Staff Scientist
Honeywell ACS Labs
Minneapolis, MN
Appendix I.D Letters from Potential Students (chronological order)

The email letters below illustrate the wide range of backgrounds, circumstances and future interests of students interested in pursuing human factors education. Many such students are currently working in industry. Some are current undergraduate students. Yet other prospective students write to the Human Factors DGS when they mistake the current Human Factors Graduate Minor program for a PhD/MS program, however these letters provide an indicator of interest in such programs.

Phone inquiries about a human factors graduate program have also come from a wide range of people in varying circumstances. Examples include:

- Metronic, Manager in Clinical Trails
- Architecture graduate student
- Ergonomist for Ameriprize Financial

Subject: Future PhD programs interest

Date: 2/21/2008 8:31 AM

>>> Hello Caroline,

I’m Kimberly VanCuren, a graduate intern here at Medtronic and have come across your name recently during my search to find PhD programs that I may consider in the future. I was given your name based on hearsay about possibly having a PhD program in the near future with some kind of focus on Human factors.

My background is more technical than engineering based. I have an undergrad in audio/video production, a MS in IT Management, and just completed my MS in Human Computer Interaction. However, I'm interested to pursue a PhD based on a mixture of engineering and psychology and focusing upon medical technology. (software and hardware)

I would like to speak with you about your background a little and what possible paths could be options. I can meet you for lunch or in the evening too.

Thank you and I look forward to your reply,
Subject: PhD at univ of Minnesota

Date: 2/16/2008 3:54 PM

Hello Caroline,

I am currently a graduate student at Marquette University, Milwaukee in Dept of Biomedical Engineering. I plan to apply to Univ of Minnesota for doctorate study in Dept of Human Factors for Spring 2009.

I realize its a minor program but I was wondering if a non UMN student can apply to it, if I can then what are the requirements do I need to submit my GRE and TOFEL scores.

Also, the website says that a student should make a course plan, I have everything laid out but wanted to know if I can apply to the doctorate program for human factors at UMN.

Sincerely,

Subject: PhD in Ergonomics

Date: 2/22/2008 7:28 AM

Greetings Professor Hayes,

I was wondering if I could get some information on your PhD program in Ergonomics. I have been working as an Ergonomist for the past 12 years and returned to school part time to do my MSc in Ergonomics. My undergraduate degree is a BSc in Kinesiology from Dalhousie University in Canada.

After I complete my MSc I would like to pursue a PhD and I would like to know more about what the University of Minnesota has to offer. Any information you could provide would be greatly appreciated.

Regards,

Student, MSc Health Ergonomics

University of Derby,
Faculty of Education, Health and Sciences,
School of Social Sciences,
Kedleston Road, Derby
DE3 9GX
Subject: Inquiry on PhD program  
Date: 3/23/2008 11:21 PM

Dear Dr. Hayes,

I have located the University of Minnesota Human Factors and Ergonomics program within the HFES website. Currently, I am completing my Master of Aeronautical Science, Human Factors, Embry Riddle Aeronautical University by the end of 2008 via the “worldwide program.” Nevertheless, I would like to know if the University of Minnesota PhD has a residency requirement.

I look forward to your response and thank you for your time.

Sincerely,

Subject: Human Factors at UMN?  
Date: 9/24/2008

Hi Dr. Hayes,

I’m interested in pursuing a Ph.D. in Human Factors/Engineering Psychology – hoping to go into R&D for biomedical devices in the future. My background is in psychology (BA) – I’m currently finishing some math and science classes. My intention had been to go into a biomed engine MS program and neuropsych Ph.D. program before I realized that this field of psych had exactly what I wanted to do covered. I have a few years of research experience at the University of Michigan med school/hospitals in neuropsychology and now in outcomes research where I’m actually getting to do a little bit of human factors/usability testing type things for some of our research/education programs. I’m really excited to get into this field for future studies and was hoping to apply to programs this year.

I see UMN’s program has a Master’s and a Ph.D. minor – but I was wondering if there was a more Human Factors oriented program set up somewhere, possibly with engineering or elsewhere, or whether it would be possible to put a greater focus on it in another branch of either psych or engineering?

Any advice or thoughts you have on this would be greatly appreciated.  
Thanks in advance!
Subject: interested in applying for the graduate program in human factors

Date: 11/24/08

Professor Hayes,

Hello. I left you a vm regarding my interest in the graduate program in human factors.

I was recently laid off from an IT consulting company and thought this would be an opportune time to invest in further education and become specialized in human factors. There is a usability designer position with a medical device firm I want to go after, but it really does require a master's in human factors.

Would you have a few moments for a phone conversation within the next week or so? I realize we have the holidays approaching, so do let me know what you can.

Thank you in advance,

________________________________________

Subject: PhD Program
Date: 11/17/2008 2:03 PM

Dear Professor Hayes,

I visited your website in Human Factors and wanted to inquire about a PhD program in your department.
I have a BS in Electronics Engineering and an MS in Software Engineering.

My interest have been in Human Computer Interaction and wanted to pursue a PhD degree with focus in HCI. I am also a full time software engineer in the medical device industry and looking at continuing studies without interruption of my career.

I would appreciate a telephone conversation with you at your convenience to explore some possibilities and learn more about your department.

What would be a good time to call you?
Thank you.

Sincerely,
Principal Software Engineer
LATITUDE System DVT
Boston Scientific Corporation
4100 Hamline Avenue, North
Arden Hills, MN 55112
Subject: Human Factors/Ergonomics  
Date: 1/17/2008 5:32 AM

Hi Caroline,

My name is xxxx. I am a graduate of the University of North Dakota with a B.S. in Aeronautics and a major in Commercial Aviation. I intend to continue my education with the pursuit of entering the M.A. program in the School of Kinesiology with an emphasis in Human Factors and Ergonomics. My experience dealing with information systems as a commercial pilot/flight instructor is one source of my interest in your program.

I met with Tom Stoffregen yesterday to gather information about the School of Kinesiology. Tom suggested I speak with you about the Human Factors and Ergonomics program. I would like to meet with you to discuss your program. My work schedule is 6:30am to 3:00pm Mon-Fri in Golden Valley. If you are available for a 4:00pm or later meeting in the near future, that would be great. If you are not available that late in the day, I can try to make something else work.

Thanks for your time.
Sincerely,

_____________

Subject: Interested in Human factors  
Date: 12/7/2008 12:53 PM

Dear Professor Hayes

I study Industrial Engineering at Sharif University of Technology in Iran. I am interested in human factors. While accomplishing a project to Reconcile organizational behavior with the foundations of Transactional Analysis theory I learned about your researches and As I find so many common interests with your field of research about human factors I came to ask you if I can pursue my Ph.D. degree in your research team and under your supervision. You can find a summery of my resume below and the complete one is attached.

Some of Accomplished projects and researches:

1. accepted paper which describes "A model to evaluate organization capability for Business Process Reengineering with respect to Organizational Culture"
2. Implementation of Knowledge Management System in presshop section of IranKhodro corp.
Subject: Human Factors and Ergonomics Paths  
Date: 12/26/2008 12:13 PM

Dear Ms. Hayes,

I am an alum of the U with a psychology major and a business minor from Carlson. Recently I have been looking into schools with a Human-Computer Interaction masters program, and I have found great interest in the School of Information at the University of Michigan. I am wondering if you have any suggestions for a similar programs at Minnesota that would allow me to use my psychology and business experience and apply it towards a more technical and design based masters. Many of the courses for the Human Factors and Ergonomics Minor are very interesting, but I am curious to see there are any available paths within the U of M system that you could suggest for a fitting home department.

Sincerely,

-----------------------------------------------------------------------

Subject: "Human Factors in Surgery: Addressing Retained Foreign Objects"  
Date: 1/7/2009 9:50 AM

Prof. Hayes,

My name is xxxx, formerly xxxxx, and I was a student in your class last year. I am currently doing some job searching, and I remembered you had a guest speaker in our class that talked about Human Factors in Surgery. I am pretty interested in this field, as well as other "process engineering" opportunities in the medical industry. I would really love to get in contact with the speaker, or possibly anyone that you might know that could have some opportunities available in Human Factors. I really enjoyed the class, and am strongly considering it as a career choice for myself. Could you maybe give me some advice on where I can look, or what I should be doing to get into this line of work? Any ideas would be greatly appreciated. I have attached my resume as well. Please let me know what you can find out for me.

Thank you for your help, and I look forward to hearing back from you,
Mechanical Engineer
Hi Prof. Hayes,

I am having a good year so far. It has been extremely busy since I was in India for a while. I hope things are well at your end.

The thesis is progressing but very slowly as you can probably tell. I do intend to come back and defend by this summer, but of course I will be sending a draft to you much before that for review and editing. It has been hard to focus since it has been really busy at work lately.

Thank you for the offer to come back for a PhD!! It means a lot that you considered me. If I do decide to get a PhD. I would want it to be in Human Factors and not in Industrial engineering. Have we got a major Human Factors program up and running yet? If not, when do you see it happening? I would certainly want to study at the U of M with you as my advisor because I really enjoyed working on my Masters degree under your guidance.

I look forward to knowing about the Human Factors program and I will keep you posted on the thesis.

Thank you very much,
31 August 2009

University of Minnesota
The Graduate School
322 Johnston Hall
101 Pleasant St. SE
Minneapolis, MN 55455

Dear Representatives of the Graduate School,

Prior to graduating from the University of Minnesota’s Master of Healthcare Administration (MHA) program this spring, I initiated my search for a PhD program in Human Factors Engineering. This search was due to my involvement with the Human Factors minor program at the University of Minnesota.

I had an excellent experience earning the MHA degree because of my addition of the Human Factors minor. I took courses from very dynamic and influential faculty members across many disciplines. This coursework, and ability to develop professional relationships with faculty, fueled my interest in the area. As I start my career in patient safety for a local health system, I am finding that this knowledge is invaluable to improving patient safety and quality of care.

My search for PhD program spans across the country as there are only a select few that offer the content and caliber of an overall, impressive program. There are programs within the Midwest that are prospects, but no programs within the state of Minnesota. It is also difficult because of the lack of distance learning programs; it would be extremely hard to leave my new position within a local care system.

If the University of Minnesota offered a PhD program in Human Factors, it would be a top contender given the talent of professors I’ve already had the privilege to learn from, as well as the location and accessibility the University of Minnesota offers.

Sincerely,

MHA
Patient Safety Lead
HealthEast Care System
1700 University Ave.
St. Paul, MN 55104
Hi Caroline,

I’m a MS student in the school of public health pursuing a degree in Health Services Research and Policy. I would like to pursue a minor in human factors. Is it possible to do this with this degree? If I pursue higher education after graduating with this degree it will most likely be a ph.d. program in human factors.

Thank you,

__________________________________________________________________________

Subject: Human Factors interest
Date: 1/15/2010 2:53 PM
To: hayes@me.umn.edu

Hello Caroline,

Thanks again for your time on the phone. Please add my email to the list of folks interested in human factors graduate programs.

Engineering Consultant, Soft Goods

Frabill, Inc.
Dear Dr. Hayes,

As I am reaching the conclusion of my studies for a Master of Science in Scientific and Technical Communication, I have been looking for a Ph.D. program in Human Factors to continue to pursue my interest in ergonomics and usability. I understand that there is a possibility of a Ph.D. degree at the University of Minnesota.

I have been looking at the University of Washington Human Centered Design and Engineering and the Texas Tech Technical Communication and Rhetoric programs. Both of these programs have the structure to permit me to complete the degree to my satisfaction. They do have the disadvantage of remote locations that would require additional complications for my family life. The Texas Tech program is available online but it does not fit my needs as fully as the University of Washington program. The UW program contains a larger engineering and design component and is more closely aligned with the direction of the U of M minor.

A Ph.D. degree in Human Factors offered by the University of Minnesota would allow me to continue my studies based on the Human Factors and Ergonomics graduate minor and avoid the family disruption that I have been considering with a possible move to Seattle. I would be commuting back to Minnesota since my wife would not be accompanying me to Seattle. Having the option to attend locally would be a major factor in the decision process.

Recently, I was able to begin employment on a contract basis for a local corporation, however it makes use of my major area but not my minor. The same company has permanent openings in human factors roles but those positions require a doctorate. This informs me that local companies have a need and desire for a doctorate offered by the U of M.

I look forward to the approval of a Human Factors Ph.D. program at the University of Minnesota.

Sincerely yours,

Date: 2/2/1010

My name is xxxxxxxxxx and I am a senior in Mechanical Engineering. In the fall of 2009 I enrolled in the class Human Factors and Work Analysis taught by Professor Caroline Hayes. The class was an excellent overview of all the area of Human Factors that exist, but at the end of the semester I was left wanting to learn more. I liked the course and subject so much I would like to continue my education within this area and eventually work in the Human Factors industry. This is why I am greatly supporting the induction of a Human Factors graduate program here at the University of Minnesota. I see that there are Human Factors programs at other universities around the country, but I would enjoy greatly remaining a student that this university and would not like to move states to attend this program.