

**Purdue's Engineer of 2020
2010-2011 Seed Grant Program
Purdue University**

Project Title: *Pilot Study: Creating a Concerned Engineer in a Changing Environment*

Total Budget Requested: \$40,000

Target Attribute(s) to be studied/implemented:

- Teamwork and collaboration
 - Communication
 - Work effectively in diverse and multicultural environments
 - Innovative and creative
 - Ethically responsible in a global, social, intellectual, and technological context
 - Adaptable in a changing environment
 - Multidisciplinarity within and beyond engineering
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A. Project Description

Introduction and Rationale

Engineering is often perceived as object-oriented rather than people-oriented (e.g., Malcom, 2008; Trytten, Shehab, Reed-Rhoads, Fleener, Harris, Reynolds, et al., 2004). For instance, a study of public perceptions of engineering revealed that “engineers are not perceived to be as engaged with societal and community concerns or to play as great a role in saving lives” (p. 17-18; National Academy of Engineering, 2008) as scientists. As a result, many students who are interested in careers that are related to helping people may not pursue an engineering-related degree in the future or may start in an engineering field, but transfer to a program that is thought to be more people-oriented. With the negative impact on the national engineering workforce where “only 40 to 60 percent of entering engineering students persist to an engineering degree, and women and minorities are at the low end of that range” (NAE, 2005, p.40), it is crucial that we find ways of stemming the engineering attrition.

Organizations such as the National Academy of Engineering have emphasized the need to promote engineering “habits of mind”, which include systems thinking, creativity, optimism, collaboration, communication, and attention to ethical considerations (NAE, 2009). Furthermore, the target attributes for the “Purdue engineer of 2020” include specific character qualities and affective dispositions as well. These “habits of mind” qualities would shift perceptions of engineers from individuals who are object-oriented workers to individuals who have a strong work ethic (in collaborations and communications), are ethically responsible (globally, socially, intellectually, and technologically), are able to adapt, and are innovative and entrepreneurial (NAE 2009; Purdue University, 2009). This would also shift the target attributes for the “engineer of 2020” to include being *ethical* and *inclusive of all segments of society*, being creative and flexible, being able to work effectively with multicultural teams, having strong communication skills, and considering sustainability issues in all aspects of the engineering process (NAE, 2008).

A trait that, although not specifically mentioned as a “habit of mind,” underscores many of the attributes ideal for the “engineer of 2020” is *empathy*. *Being able to understand the experience of others* – a widely accepted definition of empathy (see Berger, 1987) is vital to understanding problems, designing solutions, effective communication, multicultural competency, and relationship-building. While engineering as a field is just recognizing these attributes, other disciplines and fields have mastered the integration of teaching of empathy and caring into their regular curricula. Engineering as a field, and engineering education in particular, can learn from disciplines that incorporate empathy and caring as part of long standing core values and learning outcomes.

Intellectual Merit: In response to the lack of research on ‘habits of mind’ of engineering students such as empathy and care, a critical, unique and innovative aspect of this study is that we propose to bring in expertise from other fields (e.g. nursing, counseling) that have successfully taught students these skills. For example, empathy as a construct has been given much attention in the counseling literature, including a recent review of how empathy has been defined, measured, and studied (Duan & Hill, 2006). Setting up the stage for the ‘habits of mind’ discussions, we propose to address the “caring” aspect of engineering within the orientation of sustainability and current environmental concerns in engineering, building upon a successful ENG 2020 grant (2008), which is currently continued with funding provided by NSF.

Objectives of the Study

This study has three components: (1) a comparative literature review (Centre of Reviews and Dissemination, 2001) to determine how other disciplines conceptualize empathy, (2) structured focus groups (Greenbaum, 1998) with faculty in other disciplines to examine how empathy and caring is defined, measured, and integrated into the curricula and with faculty within engineering to explore the role of care and pathways to integrate into the curriculum (3) implementation of a workshop series with the goal of increasing undergraduate engineers’ habits of mind. More specifically, the objectives of component (3) in this pilot study are to research the progression towards perceiving engineering as a caring discipline (care for other people/clients and the natural environment), towards increasing empathic interactions in project groups, towards recognizing and including respectful ethical practices (e.g., such as attitudes towards gender and diversity), and towards expanding their boundaries of innovation in students’ engineering design process.

Research Questions

- (a) Which key attributes of “care” and “empathy” are perceived inside and outside of engineering, particularly by fields with a long tradition of integrating care into their curricula?
- (b) To what extent is the rich literature and experience in other disciplines in regards to “care” and “empathy” useful to inform the development of a theoretical framework and curricula of “empathy” and “caring” in the field of engineering and engineering education?
- (c) How can we strengthen undergraduate engineers’ habits of mind, especially towards care and empathy for other people/clients/stakeholders and the natural environment?

Background Literature

A preliminary literature search revealed that empathy has been defined and conceptualized in a multitude of ways in the counseling, medical, and nursing literature. Kohut (1984) defines empathy as “the capacity to think and feel oneself into the inner life of another person” (p.10). Berger (1987) describes empathy as “The capacity to know emotionally what another is experiencing from within the frame of reference of that other person, the capacity to sample the feelings of another or to put oneself in another’s shoes“ (p.2). In broader terms, empathy is categorized as dispositional empathy (e.g., a personality trait or ability), empathic experience (e.g., regardless of an individual’s level of empathy, the empathic experience will vary according to the situation), or an empathic process (multiple stages or elements of empathy) (Duan & Hill, 1996). To teach empathy, the different disciplines utilize several methods, including integration into the curricula and inclusion in course textbooks (Evans, Wilt, Alligood, & O’Neil, 1998), specific courses (Spiro, et al., 1993), training programs (Herbek & Yammarino, 1990) and workshops (Haskard, Williams, DiMatteo, Rosenthal, White, & Goldstein, 2008; Bonvicini, Perlin, Bylund, Carroll, Rouse, & Goldstein, 2009).

Measures of Empathy

There exist a wide range of measures for the construct of empathy depending on the definition and conceptualization of empathy, including self-report scales, observational protocols, and patient rating scales. In the medical literature, Pedersen (2009) found 38 quantitative measures of empathy. In addition, within the nursing literature, Yu and Kirk (2008) conducted a review that found 20 different approaches to measuring empathy, with the most common approach using a combination of assessment tools. In supporting this multi-measures approach, Pederson (2009) suggests that because self-report measures of empathy may be biased, they should be supplemented with other measures of empathy. Apart from self-report instruments, other types of empathy measures are patient rating measures, observer behavioral rating scales, and audio recording coding systems. For example, Carkhuff’s (1969) Empathic Understanding Scale uses observer ratings from levels one to five to score the level of empathic understanding. Other observer rating scales, such as the Accurate Empathy Scale (Truax, 1963) and the Roter Interaction Analysis System (RIAS; Roter & Larson, 2002) uses observer ratings video or audio taped interactions with caregivers and patients and rates the amount of empathy present in the interaction. For the purpose of this research, existing instruments needs adaptation to the particular context of engineering.

Approach

This research is conducted within the framework of a three-phase, mixed method study using initial literature review, focus group interviews, and an evaluation survey from the workshop series. The initial literature review (stage 1) will inform the cross-disciplinary faculty focus group for stage 2, which will in turn inform student workshop evaluation surveys (stage 3; Figure 1). Based upon our findings in stages 1 and 2, our findings from the literature review and faculty focus groups, we will refine the curricular workshop series to be implemented in an undergraduate engineering course. Additionally, we will develop an assessment instrument, which will measure undergraduates’ empathy and affective skills in engineering. The developed instrument will be used to assess affective outcomes such as empathy and communication of students following the workshops. This study will also inform a future Delphi study among experts in “caring” disciplines as well as career choice interviews (funding has been requested from a larger

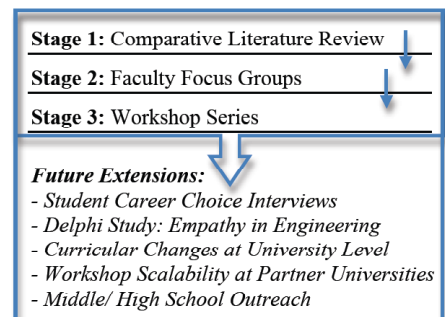


Figure 1. Design Concept Map

grant) that will help to inform curricular changes at the university level. This design-based study will allow us to provide a model for scalability of both the research findings and workshop program.

In order to conduct our “design-based research study”, we carefully selected programmatic elements for our workshop that already have a proven track record of effective use and an institutional commitment for further programmatic development based on rigorously studied factors and impact, within the context of a changing environment. The research design will use several different research methodologies: (1) A systematic literature review to compare the construct of empathy across the fields of medical, nursing, and psychology (stage 1). (2) The engineering education research team will conduct systematic focus groups and administer questionnaires to faculty and researchers in the fields of nursing, biomedical, and industrial engineering to further refine the constructs of empathy and caring in other disciplines and design instruments to measure engineering students’ empathy (stage 2). (3) The research team will utilize theoretical frameworks generally not utilized in engineering education research such as ‘caring’, empathy, ‘affective growth’ and ‘emotional intelligence’ to carry out workshops to increase undergraduate engineering students’ skills in teamwork, communication, creativity, and ethical responsibility (caring and empathy towards clients/the environment (stage 3).

Project Implementation Methods

Stage One: Comparative Literature Review

For the first stage of the study we propose to conduct a systematic literature review following the Centre of Reviews and Dissemination (2001) guidelines, on the topic of empathy, moral development, and caring. This literature review will help guide the development of faculty focus group questions and student questionnaires around the topic of empathy and caring. The literature review is intended to address the following questions that will guide further stages of this proposed research study: (a) how do different disciplines define empathy and conceptualize empathy? (b) what are the different types or stages of empathy? (c) what are the similarities and differences between conceptualizations of empathy between and among these disciplines?

Stage Two: Faculty Focus Groups

Other disciplines have been more successful in teaching empathy and have well-established theoretical constructs in practice along with the most effective instructional methods to employ. With that in mind, faculty from the nursing, counseling, biomedical and industrial engineering fields as well as other disciplines in engineering will take part in a structured focus group, following guidelines of conducting focus groups within the social sciences (Vaughn, Schumm, & Sinagrib, 1996; Greenbaum, 1998). Group discussion and interaction is important in this context to capture similar and divergent perspectives of the concept of empathy as well as giving participants the opportunity to negotiate, confront, commiserate, or modify their viewpoints as the discussion progresses (Kidd & Parshall, 2000). The focus group will be driven by literature surrounding the best practices, measures, and integration for teaching empathy, along with ways to improve the curriculum within this project and within the school of Engineering itself. The focus group will lead to future partnerships between university schools and engineering departments, establishing a solid foundation for supporting this type of work. The focus group will be facilitated and managed with the support of a virtual collaboration space, systemgroup™, which specializes on facilitation of group processes.

Stage Three: Workshop Implementation

We propose to introduce three themes within a workshop series that is intended to increase engineering students’ habits of mind, including empathy, and has the potential to initiate student thinking as engineering being a “caring” discipline, including (a) a changing



Figure 2. Activity Concept Map

environment, (b) community focus, and (c) concerned engineers (Figure 2). The students will discuss the attributes of a changing environment, carry out integrated engineering activities with a community focus, and reflect on their role as a concerned engineer and community member. The target population will be first year engineering students at Purdue. Purdue faculty will also be invited to participate in the workshops.

Expected Results

On a broader sense, students who participate in the program are expected to incur multiple benefits including the motivation for studying (and continuing to study) engineering. This will be accomplished by connecting them to environmentally focused work that matters, by developing their engineering ‘habits of mind’, and by emphasizing the recognized technical need for sustainable engineering education within the discipline of engineering. More specifically, students will perceive engineering as a caring discipline, be more aware of sustainability issues, be more ethically responsible, and develop innovative solutions for engineering design projects within the changing environment.

Assessment Methods

Our approach is to build on work in the medical and counseling fields to develop and pilot test instruments to measure empathy, implement proven survey instruments, and create and compare empathy models across disciplines and levels of expertise. Two types of instruments will be developed and/or modified: behavioral rating scale and self-assessment instruments (e.g., Interpersonal Reactivity Index; Davis, 1983). As environmental constraints are integral to the design process, student’s environmental knowledge will be assessed with two previously used instruments and compared using the Environmental problem/solution (Weber, 2008) instrument. Weber’s (2008) Environmental problem and solution target question is an explicit measure that looks at how the knowledge of problems and solutions and the degree of specificity in thinking about these issues changes over time.

Dissemination

Results of this study will be disseminated at the Purdue Engineering Education weekly research seminar series. The assessment instruments and instructional approaches will be made available on the National Science Digital Library (NSDL) website, which is publicly available. We will also submit the results of this study for presentation at the American Society of Engineering Education (ASEE) annual conference. Finally, the workshops are a form of dissemination because they will be made available to Purdue’s engineering faculty as well as faculty in other disciplines. In order to build upon the results of this pilot study, we have applied for additional NSF funding to extend and to carry out the project at a larger scale. In addition, the results of this grant will inform the research team in carrying out a structured study dialogue among experts in “caring” disciplines utilizing the *Delphi Method*. The objective of most Delphi applications is the reliable and creative exploration of ideas or the production of suitable information for decision-making (Adler & Ziglio, 1996).

B. Implementation Strategy and Timeline

Three half-day workshops will be carried out to incorporate the three themes mentioned above, each two weeks apart. The workshops have been adapted from those developed by the Institute for Healthcare Communication (IHC), a non-profit foundation dedicated to enhancing the quality of health care through improved clinician-patient communication, and the work of Haskard et al. (2008). First developed in 1986 after an extensive literature review and needs assessment, the first workshop is built around the 4E model (Figure 3: Engage, Empathize,

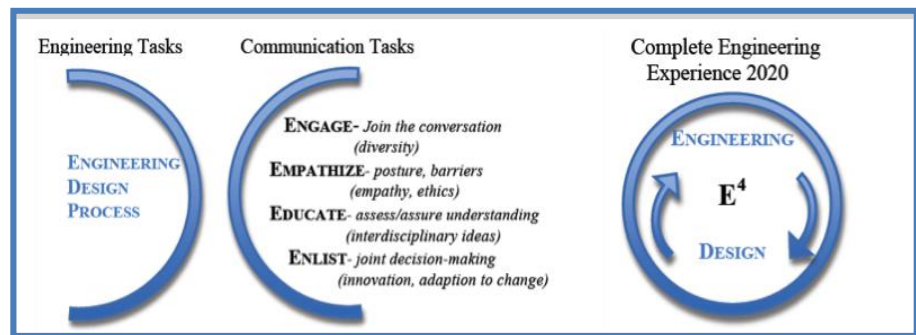


Figure 3. The 4 E Model Adapted to Engineering

Educate, and Enlist) used in clinician-patient communication (Keller & Carroll 1994), and adapted here to the Engineering design process. Mirroring the work of Haskard et al. (2008), the two additional workshops are designed to build a deeper core for the competencies developed in the first workshop, including between team members and clients (Table 1).

TRAINING/ ASSESSMENTS	DESCRIPTION OF TRAINING	EXAMPLE ACTIVITIES
<i>Time 1- Baseline Assessment</i>		
First Workshop- mid March	Interactive workshop focusing on the core E4 communication skills: examples from the field (Keller & Carroll 1994)	-case studies from other fields (i.e. medical, nursing) - introduction to Caroline Bailie’s “Engineering, Social Justice, and Peace” http://esjp.wikispaces.com/ -introduction of teams and projects
Second Workshop- early April	Interactive workshop focusing on the core E4 communication skills between team members (Keller & White 1997)	-enhance communication and building student confidence and conviction behavioral change -shift in project process (i.e. boss loss funding), reassess design
Third Workshop- late April	Interactive workshop focusing on the core E4 communication skills with clients (Kemp-White & Keller 1998)	- a review of a “difficult” interaction - closing by guest speakers in engineering
<i>Time 2- Assessment after workshops</i>		
<i>Time 3- Assessment 1 months after workshops</i>		

Table 1. Workshop Series Description

Project Timeline

The proposed study will take approximately one year to complete. To start, the months of May to August 2010 will consist of the comparative literature review, faculty focus group, and student interviews. When these have been completed, we will collect baseline measures from the undergraduate engineering participants in September and October 2010. In the months of October and November 2010 the workshops that have been developed will be carried out in the undergraduate classrooms. After the workshops are completed, post assessments will take place in November to December 2010. From December 2010 to February 2011, we will analyze the data and prepare to disseminate the results of our study to several audiences. Finally, from February to April 2011, funding will be sought from outside sources to continue and expand the study while efforts to disseminate the results of the study will be continued.



Activity	Month											
	May 2010	June 2010	July 2010	Aug. 2010	Sept 2010	Oct. 2010	Nov. 2010	Dec. 2010	Jan. 2011	Feb. 2011	Mar. 2011	April 2011
Stage One: Comparative Literature Review												
Stage Two: Faculty Focus Group												
Baseline measures collected from participants												
Stage Three: Workshops												
Post assessments will take place												
Data analysis												
Dissemination of results												
Seek funding from outside sources												
Table 2. Project Timeline												

C. Personnel Requirements

Please indicate the portion of FTE that each faculty member will dedicate to the project

Faculty member	Summer 2010	Fall 2010	Spring 2011
Johannes Strobel	5%	10%	10%
Inez Hua	5%	10%	10%
Wachter Morris, C	5%	10%	10%

D. Budget

Faculty/Staff Member Funding				
<i>Please indicate the funding (dollars and time) you are requesting for the grant for this project)</i>				
Faculty/Staff Name:	Grant funds requested			
	% Time	Fringe Benefits	\$\$	
Wachter Morris, Carrie	0.25	611	1639	
Melissa Dyehouse – INSPIRE funded	0.1		N/A	
Nicole Weber – INSPIRE funded	0.1		N/A	
Subtotal Faculty/Staff Funding		\$ 611.00	\$ 1639.00	
Graduate Students				
Type of position	Grant funds requested			
	% Time	Insurance + Fee Remit	Fringe Benefits	\$\$
TBA, Graduate RA	50%	9780	124	24782
Subtotal Grad Student Personnel		\$ 9780.00	\$ 124.00	\$ 24782.00
Undergraduate Student Funding				
<i>Please indicate the student resources (funding and time) you are requesting from the grant for this project.</i>				
Type of position	Grant funds requested			
	Hrs/week	Fringe Benefits	\$\$	
Undergraduate student	5	289	\$775	
Participant stipend	\$50 x 20 participants		\$1000	
Subtotal Undergrad Student Personnel		289	1775	
Equipment \$ Software Funding				
<i>Please list all specialized equipment and software required for the project. (Do not</i>				

<i>include standard computer equipment and commonly-available software, e.g. Microsoft Office, Microsoft Windows). Mark whether any of the equipment or software is provided by the department. (Note that only 10% of the funds can be used to purchase equipment and it needs to be dedicated to the goals of the project.</i>	
Name of Equipment	Funds Requested
N/A	
Subtotal Equipment	\$0.00
Name of Software	
Web application license to facilitate collaborative and distance focus group: license for systemgroup™.	1000.00
Subtotal Software	\$1000.00
Other miscellaneous items (Computer media, cables, etc)	
Supplies	\$200
Subtotal miscellaneous	\$200.00
Other expenses	
Subtotal other expenses	\$1,200
Total Expenses	\$40,000

E. Budget Justification

Dr. Johannes Strobel will oversee the research, facilitate the focus groups and manage the project. Dr. Inez Hua will oversee the programmatic workshop components and will facilitate the focus groups particularly with engineering faculty. While Drs. Strobel and Hua will expend effort on the project, their salary for the effort will be supported by INSPIRE and DEEE respectively. Dr. Carrie Wachter Morris will provide her expertise from Counseling to the project, particularly synthesizing the findings on caring and guiding the literature review. She will provide feedback on the integration of caring into the workshops.

Drs. Dyehouse and Weber, Post-Doctoral Researchers of INSPIRE will work on the project, particularly the research operation (Dyehouse) and the development and implementation of the workshops (Weber). Both their salary is covered by INSPIRE.

One graduate student will be hired to support the facilitation of the research, the design of research materials, the data collection, analysis, and reporting of the data. The graduate student will contribute to the development and implementation of the workshop series as well.

One undergraduate student will be hired to assist in technical matters of the facilitation of the focus groups and transcribing. The project team will connect the undergraduate position with existing undergraduate research opportunities at Purdue such as DURi and SURF.

Participants in the focus group, particularly from other disciplines will receive \$50 for participation in the study, including multiple sessions.

Software

License for systemgroup™, a web application to facilitate focus groups will be purchased in order to manage the process of structured focus group.

Other expenses include supplies (for the workshops and focus groups).

F. References

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G. PI Biosketch (1-2 pages following similar format used for NSF grants)

Biographical Sketch Johannes Strobel, Ph.D.

Purdue University; CIVL G167A, West Lafayette, IN 47907, jstrobel@purdue.edu, 765-496-1334

(i) Professional Preparation:

Munich School of Philosophy, Germany, Philosophy, B.Ph., 1997

Saarland University, Germany, Information Science, B.S. (equiv.), B.A. Theology (equiv.), 1999

University of Missouri-Columbia, Learning Technologies, M.Ed., 2002

University of Missouri-Columbia, Information Science and Learning Technologies, Ph.D., 2004

(ii) Appointments:

Director, INSPIRE, Institute for P-12 Engineering Research and Learning, Purdue University, 2008 – current

Assistant Professor, School of Engineering Education & Educational Technology, Purdue University, 2007 – current

Assistant Professor, Department of Education, Concordia University, Montreal, 2005 – 2007

GRA, Manager & Fellow in Learning Sciences, University of Missouri-Columbia, 2000 – 2004

(iii) Publications

Five Publications Closely Related:

Strobel, J., Hua, I., Fang, J. & Harris, C. (in press) Not all constraints are equal: Stewardship and boundaries of sustainability as viewed by first-year engineering students. *International Journal of Engineering Education*. Special Issue on Sustaining Sustainable Design.

Clariana, R. & Strobel, J. (2007) Modeling Technologies. in J.M. Spector, M.D. Merrill, J.J.G. van Merriënboer, & M.P. Driscoll (Eds.) *AECT Handbook of Educational Communications and Technology*. 3rd Ed., Mahwah, NJ, USA: Lawrence Erlbaum Associates.

Jonassen, D., Strobel, J., & Lee, C.B. (2006) Everyday Problem Solving in Engineering: Lessons for Engineering Educators, *Journal of Engineering Education*, 95, 2, 139-150.

Hyslop-Margison, E.J. & Strobel, J. (2008) Constructivism and Education: Misunderstandings and Pedagogical Implications. *The Teacher Educator*.

Strobel, J., Jonassen, D.H. & Ionas, I.G. (2008) The evolution of a collaborative authoring system for non-linear hypertext: A design-based research study. *Computers & Education*, 51, 1, 67-85.

Five Other Publications:

Niederhauser, D., Lindstrom, D. & Strobel, J. (2007). Addressing the NETS*S in K-12 Classrooms: Implications for Teacher Education. *Journal of Technology and Teacher Education*. 15 (4), pp. 483-512.

Strobel, J. (2007) Composition of Compound Problems and Transitions within Compound Problems: Workplace Research to Inform Engineering Education. *Proceedings of the First International Conference on Research in Engineering Education*, Hawaii: June, 22 – June, 24 2007.

Liu, W., Carr, R., & Strobel, J. (2009). Extending teacher professional development through an online learning community: A case study. *Journal of Educational Technology Development and Exchange*, 2(1), 99-112.

Strobel, J. & van Barneveld, A. (2009) When is PBL More Effective? A Meta-synthesis of Meta-analyses Comparing PBL to Conventional Classrooms. *Interdisciplinary Journal of Problem-based Learning*, 3, 1, 44-58.

Strobel, J. (2006) Participatory design strategies for eLearning: a design-based research approach in the field of Educational Technology. In J. Multisilta (Ed.) *Proceedings of the workshop on human centered technology*. Pori Publications, Tampere University of Technology.

Synergistic Activities:

Private Foundation: INSPIRE: Funding for the Institute for P-12 Engineering Research and Learning. \$1,000,000 (2009 – 2010, Director and Co-PI)

National Science Foundation: R&D: Quality Cyber-Enabled, Engineering Education Professional Development to Support Teacher Change and Student Achievement (E2PD). \$2,970,000. NSF DR K-12. (2008 – 2013 Co-PI)

National Science Foundation: Engineering Students' Attitudes and Threshold Concepts Towards Sustainability and Engineering as Environmental Career. \$149,998 (2009 – 2011, PI)

National Science Foundation: VOSS: Transforming Loose Networks into Sustainable Interdisciplinary Virtual Organizations. \$374,769 (2009 – 2011, PI)

National Science Foundation: CCLI Type III: Collaborative Research: ciHUB a virtual Community to Support Research, Development, and Dissemination of Concept Inventories. \$754,667.00 (2009 – 2013, Co-PI).

Director, Institute for P-12 Engineering Research and Learning

Co-Captain, Strategic Planning, College of Engineering: Pre-university involvement

Affiliated Faculty, Purdue Center for Serious Games and Learning in Virtual Environments

Faculty Fellow, P-12, sTEM initiative, Purdue University

(v) Collaborators & Other Affiliations:

(a) Collaborators:

Abrami, Philip C.; Bethel, Edward C.; Dicks, Dennis; High, Steven; Idan, Einat; Lowerison, Gretchen; Razlogova, Elena; Shaikh, Kamran; Shaw, Steven; Zhang, Dai; all Concordia University, Montreal, Canada; Clariana, Roy, Pennsylvania State University; Hung, Woei, University of North Dakota; Hyslop-Margison, Emery, University of New Brunswick, Canada; Ionas Gelu Ioan, Ionas Gelu, University of Missouri-Columbia; Lavoie, Marie-Claude, TELUQ, Montreal; Marino, Olga, TELUQ, Montreal, Canada; Gilbert Paquette, TELUQ, Montreal, Canada; Lee, Chwee Beng, Nanyang Technological University, Singapore; Niederhauser, Dale, Iowa State University; Spector, Michael, Florida State University; Tillberg-Webb, Heather, Johns Hopkins University. Madhavan, Krishna P.C., Numerous faculty members at Purdue University (from College of Technology, Education and Engineering)

(b) Graduate Advisors:

David Jonassen, Richard Callahan, Rose Marra, James Laffey, Sanda Erdelez, all University of Missouri-Columbia

(c) Thesis Advisor (completed)

Glenn Wadman, M.A., Tzemopoulos, Antonia, M.A., Levine, Reisa, M.A., Taylor, Ray, M.A., Ilkbasaran, Deniz, M.A., University of California, San Diego, Idan, Einat, M.A., Gomez-Umana, Alejandro, M.A., Araki, Marci, M.A., all Concordia University, Montreal, Canada; Neha Gupta, M.S. Purdue University

(d) Currently supervising:

Three Post-Doctoral Researcher: JeongMin Lee; Nicole Weber (co-advised); Melissa Dyehouse (co-advised)

Ten Ph.D. students: Celia (Pan) Rui; Shih-Ping Kuo; Noah Salzman; Mary Pilotte; Amy van Epps; Jea Choi; Angela van Barneveld; Nikki Kim; Yi Luo; Marisol Mercado (Co-supervisor);

Three M.S. students: Ron Carr; Christian Hall; Magdiel Guardado

Undergraduate research assistants: 8 (supervised and currently supervising)

INEZ HUA

School of Civil Engineering and the Division of Environmental and Ecological Engineering
Purdue University, West Lafayette, IN 47907
Ph: (765) 494-2409; FAX: (765) 496-1988; Email: hua@purdue.edu

A. Education

California Institute of Technology, Pasadena	Environmental Science and Engineering	PhD	1996
California Institute of Technology, Pasadena	Environmental Science and Engineering	MS	1992
University of California, Berkeley	Biochemistry	BA	1990

B. Academic Appointments

August 2009- present	Associate Director, Global Engineering Programs, Purdue University
August 2007 – present	Full Professor, School of Civil Engineering, Purdue University
July 2006 – August 2009	Founding Interim Head, Division of Environmental and Ecological Engineering, Purdue University
August 2001 – present	Associate Professor, School of Civil Engineering, Purdue University
January 1996 – August 2001	Assistant Professor, School of Civil Engineering, Purdue University

C. Non-Academic Appointments

June - August 2004	NASA/ASEE Faculty Fellowship (first and second year award)
June - August 2003	NASA Ames Research Center, Mountain View, CA
July – December 2002	Sabbatical leave - U. S. Environmental Protection Agency, Region 9 Headquarters, San Francisco, CA
September 1990- December 1995	California Institute of Technology, Pasadena, CA Graduate research assistant
June-September 1990; June-January 1990	The Dow Chemical Company, Pittsburgh, CA Intern
May-September 1998;	Department of Chemistry University of California, Berkeley, CA
January-May 1989	Undergraduate Research Assistant
May-August 1986	Lawrence Berkeley Laboratory, Berkeley, CA Intern

D. Publications

Ten peer-reviewed journal publications most closely related to the proposal.

1. Kuo, Y-M., Sepulveda, Maria S., Hua, I., Ochoa-Acuna, H.G. Sutton, T.M., **Bioaccumulation and biomagnifications of polybrominated diphenyl ethers in a food web of Lake Michigan**, *Ecotoxicology*, published on-line November 1, 2009. DOI 10.1007/s10646-009-0431-1.
2. Kuo, Y-M., Sepulveda, Maria S., Sutton, T.M., Ochoa-Acuna, H.G., Muir, A. M., Miller, B., Hua, I., **Bioaccumulation and biotransformation of decabromodiphenyl ether and effects on daily growth in juvenile lake whitefish (*Coregonus clupeaformis*)**, *Ecotoxicology*, published on-line December 22, 2009. DOI 10.1007/s10646-009-0451-x.
3. Nienow, A. M., Jafvert, C.T., Hua, I. **Hydrolysis and H₂O₂-Assisted UV Photolysis of 3-Chloro-1,2-Propanediol**, *Chemosphere*, 75(8), pp. 1015-1020, 2009.
4. Nienow, A.; Hua, I.; Poyer, I.; Bezares-Cruz, J.C.; Jafvert, C., **A Multifactor Statistical Analysis of the H₂O₂ Enhanced Photodegradation of Nicotine and Phosphamidon**, *Industrial and Engineering Chemistry Research*, 48(8),pp. 3955–3963, 2009.
5. Nienow, A. M., Bezares-Cruz, J.C., Poyer, I.C., Hua, I., Jafvert, C.T., **Hydrogen Peroxide-Assisted UV Photodegradation of Lindane**, *Chemosphere*, 72(11), pp. 1700-1705, 2008.

6. Ahn*, M.-Y.; Filley, T. R.; Jafvert, C. T.; Nies, L.; Hua, I.; **Birnessite Mediated Debromination of Decabromodiphenyl Ether**, *Chemosphere* 64(11), 1801-1807, 2006.
7. Ahn*, M.-Y.; Filley, T. R.; Jafvert, C. T.; Nies, L.; Hua, I.; *Bezares-Cruz, J.*, **Photodegradation of Decabromodiphenyl Ether Adsorbed onto Clay Minerals, Metal Oxides, and Sediment**, *Environ. Sci. Technol.* 40(1), pp. 215-220, 2006.
8. Zhai*, X., Hua, I., Rao, P. S. C., Lee, L. S., **Co-solvent Enhanced Chemical Oxidation of Perchloroethylene by Potassium Permanganate**, *Journal of Contaminant Hydrology*, 82(1-2), pp. 61-74, 2006.
9. Kang*, N., Hua, I., Rao, P. S. C., **Enhanced Fenton's Destruction of Non-aqueous Phase Perchloroethylene in Soil Systems**, *Chemosphere*, 63(10), pp. 1685-1698, 2006.
10. Kang*, N., and Hua, I., **Fenton oxidation of BTEX Compounds in Soil Slurry Systems**, *Chemosphere*, 61(7), pp. 909-922, 2005.

D. Synergistic Activities

- (i) Member, committee to study: Management and Effects of Coalbed Methane Development and Produced Water in the Western United States, Board on Earth Sciences Resource, Water Science and Technology Board, **The National Academies** (2009).
- (ii) Chair, Proposal Review Panel, SBIR Environmental Monitoring and Remediation (ZRG1 BST-G (11)), **National Institutes of Health**, 2008.
- (iii) Member, Committee for the Technical Assessment of Environmental Programs at the Los Alamos National Laboratory, Nuclear and Radiation Studies Board, **The National Academies** (2006).
- (iv) Participant in a multi-stakeholder partnership organized by the **U.S. EPA** Design for Environment (DfE) Program to examine environmental effects of flame retardants in specific applications (2006).
- (v) Member of a review panel convened by the **U.S. Department of Energy** to review various aspects of the Environmental Molecular Sciences Laboratory (EMSL) of Pacific Northwest National Laboratory (2005).

E. Collaborators and Other Affiliations

- (i) Collaborators and Co-Editors

Purdue University: C. Jafvert, L. Nies, T. Filley, L. Lee, P. S. C. Rao, R. Mohtar, M. Helgesen, R. Turco, T. Seager, H. Acuna-Ochoa, M. Sepulveda, L. Raymond, C. Handwerker, J. Youngblood, J. Strobel, S. Hoffmann.

NASA Ames (Mountain View, CA): L. Iraci.

University of West Florida: J.A. Stuart Williams

Gustavus Adolphus College: A. Nienow

University of Alaska: T. Sutton

- (ii) Graduate (Doctoral) Advisor: Dr. Michael R. Hoffmann, California Institute of Technology

- (iii) Thesis and Post-Doctoral Scholar Sponsor: n/a

Dr. Hua has advised (as a committee chair or member) over 30 graduate students and four post-doctoral scholars.

Graduated with thesis MS or PhD: Ulrike Pfalzer-Thompson (MS), Kristin Rogers (MS), Irene Poyer (MS), Jennifer Baldwin (*formerly Schramm*) (PhD), Michael Beckett (PhD), Guangming Zhang (PhD), Namgoo Kang (PhD), Xihong Zhai (PhD), Yin-Ming Kuo (PhD).

Post-Doctoral Scholars: Dr. Nicole Weber (co-advised with J. Strobel), Dr. Jose Duque Fabrega, Dr. Mi-Youn Ahn, Dr. Amanda Nienow, Dr. Jeonghyub Ha.

Biographical Sketch Carrie A. Wachter Morris, Ph.D.

Purdue University; BRNG 5166, West Lafayette, IN 47907, cawm@purdue.edu, 765-494-9625

(i) Professional Preparation:

University of North Carolina at Chapel Hill, Psychology, B.A., 2000

University of North Carolina at Chapel Hill, Communication Studies, B.A., 2000

University of North Carolina at Greensboro, School Counseling, M.S., 2003

University of North Carolina at Greensboro, Counseling and Counselor Education, Ph.D., 2006

(ii) Appointments:

Assistant Professor, Counseling and Development Program, Department of Educational Studies, Purdue University, August 2006 – current

(iii) Publications

Five Publications Closely Related:

Five Other Publications:

Wachter Morris, C. A., Shoffner, M. F., & Newsome, D. W. (2009). Career counseling for women preparing to leave abusive relationships: A social cognitive career theory approach. *Career Development Quarterly*, 58, 44-53

Wachter, C. A., Clemens, E. V., & Lewis, T. F. (2008). Exploring school counselor involvement of student stakeholders and school counselor burnout through an Adlerian theoretical framework. *Journal of Individual Psychology*, 64, 432-449.

Wachter, C. A., Barrio Minton, C. A., & Clemens, E. V. (2008). Crisis specific supervision of school counselors: The P-SAEF Model. *Journal of Professional Counseling: Practice, Theory, and Research*, 36 (2), 13-24.

Wachter, C. A., & Bouck, E. (2008). Suicide and students with high incidence disabilities: What special educators need to know. *Teachers of Exceptional Children*, 41, 66-72.

Villalba, J. A., Brunelli, M. A., Lewis, L. D., & Wachter, C. A. (2007). Examining the academic and personal social characteristics of Latina/o children in Southeastern U.S. rural, burgeoning Latino communities. *The Rural Educator*, 28, 12-19.

Synergistic Activities:

Developed serious game (video game built around specific learning objectives) to train school counselors-in-training and school counselors on suicide prevention and assessment.

Editorial Board Member for *Professional School Counseling*, 2008 – present

Vice President for Post-Secondary Education, *Indiana School Counselor Association* (includes conducting outcome research, testifying to subcommittees and study panels of the Indiana State Legislature, and advisory board member to Indiana Superintendent of Public Schools.)

Co-Chair of the Leadership Fellowship in Counselor Education, *Chi Sigma Iota, International* (Counseling Academic and Professional Honor Society)

Scientific Review Panel for *International Conference on Teaching and Learning*, Riyadh, Saudi Arabia, 2009.

(v) Collaborators & Other Affiliations:

(a) Collaborators:

Deborah Bennett, Emily Bouck, Melanie Shoffner, Anna Douglas, Sara Tedrick, Lisa Bohlin, Jean Peterson, Heather Servaty-Seib, Don Werden, Susan Prieto-Welch, Ji-Yeon Lee, Nathan Miles, Scott Deatherage, all Purdue University; Sue Whiston, Indiana University; Matthew Lemberger, University of Missouri—St. Louis; Casey Barrio Minton, University of North Texas; Elysia Clemens, University of Northern Colorado, Todd Lewis and Deborah Taub, both

University of North Carolina at Greensboro; Allison Smith, Antioch College; Marie Shoffner, University of Virginia, Deborah Newsome, Wake Forest University Catherine Tucker, Indiana State University; Andrea Dixon, University of Florida

(b) Graduate Advisors:

Craig Cashwell, Todd Lewis, Terry Ackerman, and Robert Strack, all University of North Carolina at Greensboro.

(c) Thesis Advisor (completed)

Major Advisor, Thesis Option—Megan Smith

Dissertation Committee Member—Jonathan Mosko

Thesis Advisor Member—Tansey Mulligan, Mary Helen Nesbitt

Major Advisor, non-Thesis—16

(d) Currently supervising:

Dissertation Committee Member—4

Major Advisor, non-thesis—8

Biographical Sketch Melissa Dyehouse, Ph.D.

Purdue University; CIVL G167G, West Lafayette, IN 47907, mdyehous@purdue.edu, 765-496-3876

(i) Professional Preparation:

Indiana University, French, Psychology, B.A., 2000
Purdue University, Educational Psychology, M.S.Ed., 2003
Purdue University, Educational Psychology, Ph.D., 2009

(ii) Appointments:

Postdoctoral Research Assistant, INSPIRE, Institute for P-12 Engineering Research and Learning, Purdue University, Aug. 2009 – current

(iii) Publications

Five Publications Closely Related:

Dyehouse, M., Detweiler, J., Li, J., Madden, K., Bennett, D., Harbor, J., & Childress, A. (in press). *Practical ways to assess and change your students' perceptions of scientists*. Science Scope.

Five Other Publications:

Dyehouse, M., Bennett, D., Harbor, J., Childress, A., & Dark, M. (2009). A comparison of linear and systems model approaches for program evaluation illustrated using the Indiana Interdisciplinary GK-12. *Evaluation and Program Planning*, 32, 187-196.

Dyehouse, M., Baek, J., & Lesh, R. (2009). Multi-tier design assessment in the development of complex organizational systems. In Schreiner, C. (Ed.). *Handbook of Research on Assessment Technologies, Methods, and Applications in Higher Education* (pp. 1 – 21). Hershey, PA: IGI Global.

Dyehouse, M. A., Diefes-Dux, H. A., Bennett, D. E., & Imbrie, P. K. (2008). Development of an instrument to measure undergraduates' nanotechnology awareness, exposure, motivation, and knowledge. *Journal of Science Education and Technology*, 17(5), 500 – 510.

Diefes-Dux, H. A., Dyehouse, M. A., Bennett, D. E., & Imbrie, P. K. (2007). Nanotechnology awareness of first-year food and agriculture students following a brief exposure. *Journal of Natural Resources and Life Sciences Education*, 36, 58-65.

Dyehouse, M. A. & Bennett, D. E. (2006). Validity evidence for a computer-based alternate assessment instrument. *Assessment for Effective Intervention*, 31, 11-31.

Synergistic Activities:

N/A

(v) Collaborators & Other Affiliations:

(a) Collaborators:

Deborah Bennett, Heidi Diefes-Dux, Jon Harbor, Amy Childress, Wilella Burgess, Melissa Dark, Omolola Adedokun, Andrew Koch, Mary Pilat, Matthew Pistilli, P.K. Imbrie; all Purdue University, Richard Lesh; Indiana University, John Baek; Oregon State University

(b) Graduate Advisors:

Deborah Bennett, Brian French, Yan Ping Xin, and Teresa Taber-Doughty; all Purdue University

(c) Thesis Advisor (completed)

N/A

Biographical Sketch **Nicole Weber, Ph.D.**
Purdue University; CIVL G167G, West Lafayette, IN 47907, nrweber@purdue.edu, 765-496-3876

(i) Professional Preparation:

University of Minnesota, St. Paul, Ecology, Evolution, and Behavior, B.S., 1994
Peace Corps, Honduras, Community development and Language Training, 1999
University of Massachusetts, Boston, Environmental Biology, Ph.D., 2008

(ii) Appointments:

Postdoctoral Research Assistant, INSPIRE, Institute for P-12 Engineering Research and Learning, Purdue University, Aug. 2009 – current
High School Biology Instructor, Boston Public Schools, Boston, Ma, August 2006 –2007

(iii) Publications

Five Publications Closely Related:

- Weber, N. 2008. A Comparative Analysis of Locally-based Conservation Education Programs that Promote Issue Awareness and Community Solutions within Honduras and the United States (Doctoral Dissertation, University of Massachusetts, Boston, 2008)
Dissertation Abstracts International, v70 (5B). pg 2801, pn: 3360797.
- Weber, N. 2006. Environmentally Charged Curriculum: How Teachers can make connections. *New England Chapter of the Society for Conservation Biology*.
<http://www.nescb.org>.
- White, B., Kim, S., Sherman, K, & Weber, N. 2002. Evaluation of Molecular Visualization Software for Teaching Protein Structure: Differing Outcomes from Lecture and Lab. *Biochemistry and Molecular Biology Education*. v30(2) 130-6.
- Weber, N. and R. Wadsworth. 2002. El Plan de Educación Ambiental para La Reserva del Hombre y La Biosfera del Río Plátano. Tegucigalpa, Honduras. pp.32

(v)

(a) Collaborators & Other Affiliations:

Inez, Hua (Purdue University); Johannes Strobel (Purdue University); Steve Hoffmann (Purdue University), Brian White (UMASS Boston), Stella Kim (UMASS Boston), Katerina Sherman (UMASS Boston), Robin Wadsworth (New York Restoration Project)

(b) Graduate Advisors:

Dissertation Committee Members:

Brian White (Chair), Kamaljit Bawa , Carol Smith, Russell Schutt

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.			
Investigator: Dr. Johannes Strobel	Other agencies (including NSF) to which this proposal has been/will be submitted.		
Support:	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future
			<input type="checkbox"/> *Transfer of Support
Project/Proposal Title: R & D Quality Cyber-Enabled, Engineering Education Professional Development to Support Teacher Change and Student Achievement (E2PD)			
Source of Support: NSF DR K-12			
Total Award Amount: \$3,000,000		Total Award Period Covered: 2008-2012	
Location of Project: Purdue University			
Person-	0	Cal: 0	Acad: Sumr: 1
Support:	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future
			<input type="checkbox"/> *Transfer of Support
Project/Proposal Title: Science Learning through Engineering Design (SLED) Targeted Partnership			
Source of Support: NSF MSP			
Total Award Amount: \$6,793,800		Total Award Period Covered: March 2010 - 2015	
Location of Project: Purdue University			
Person-		Cal: 0	Acad: .25 Sumr:
Support:	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future
			<input type="checkbox"/> *Transfer of Support
Project/Proposal Title: Engineering Students' Attitudes and Threshold Concepts Towards Sustainability and Engineering as Environmental Career			
Source of Support: National Science Foundation			
Total Award Amount \$149,998		Total Award Period Covered: September 2009 - 2011	
Location of Project: Purdue University			
Person-		Cal:	Acad: 0 Sumr: 0
Support:	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future
			<input type="checkbox"/> *Transfer of Support
Project/Proposal Title: STEP TYPE II: INSPIRE 2 STEP FORWARD IN ENGINEERING			
Source of Support: National Science Foundation			
Total Award Amount \$ 1,378,711.00		Total Award Period Covered: September 2010 - 2014	
Location of Project: Purdue University			
Person-		Cal:	Acad: 0 Sumr: 0
Support:	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future
			<input type="checkbox"/> *Transfer of Support
Project/Proposal Title: sPBL in Engineering: Integrating Service-Learning and Problem-Based Learning to Infuse ?Engineering as a Caring Discipline? into High-Schools			
Source of Support: National Science Foundation			
Total Award Amount \$ 3,400,000.00		Total Award Period Covered: September 2010 - 2014	
Location of Project: Purdue University			
Person-		Cal:	Acad: 1 Sumr: 0

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Inez Hua	Other agencies (including NSF) to which this proposal has been/will be submitted.
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Support:	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future	<input type="checkbox"/> *Transfer of Support
Project/Proposal Title:				
Engineering Students' Attitudes and Threshold Concepts Towards Sustainability and Engineering as Environmental Career				
Source of Support: National Science Foundation				
Total Award Amount: \$149,998		Total Award Period Covered: 2009-2011		
Location of Project: Purdue University, West Lafayette				
Person-Months Per Year Committed to the Project.				
	Cal:	Acad:	Sumr:	

Support:	<input checked="" type="checkbox"/> Current	<input type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future	<input type="checkbox"/> *Transfer of Support
Project/Proposal Title:				
Photochemical Fate Of Manufactured Carbon Nanomaterials in the Aquatic Environment				
Source of Support: U.S. EPA				
Total Award Amount: \$199,990		Total Award Period Covered: 07/01/07-6/30/10		
Location of Project: Purdue University, West Lafayette				
Person-Months Per Year Committed to the Project.				
	Cal:	Acad:	Sumr:	

Support:	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future	<input type="checkbox"/> *Transfer of Support
Project/Proposal Title:				
CCECE: Creating a Concerned Engineer in a Changing Environment – this proposal				
Source of Support: National Science Foundation				
Total Award Amount: \$400,000		Total Award Period Covered: 2010-2013		
Location of Project: Purdue University, West Lafayette				
Person-Months Per Year Committed to the Project.				
	Cal:	Acad:	Sumr:	

Support:	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future	<input type="checkbox"/> *Transfer of Support
Project/Proposal Title:				
Building Early Student Cohorts in the Environmental and Ecological Engineering programs				
Source of Support: National Science Foundation				
Total Award Amount: \$600,000		Total Award Period Covered: 2010-2014		
Location of Project:				
Person-Months Per Year Committed to the Project.				
	Cal:	Acad:	Sumr:	

Support:	<input type="checkbox"/> Current	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Submission Planned in Near Future	<input type="checkbox"/> *Transfer of Support
Project/Proposal Title: INSPIRE 2 STEP Forward in Engineering				
Source of Support: National Science Foundation				
Total Award Amount: \$1,371, 468		Total Award Period Covered: 2010-2014		
Location of Project: Purdue University, West Lafayette				
Person-Months Per Year Committed to the Project.				
	Cal:	Acad:	Sumr:	

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.

Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Inez Hua Other agencies (including NSF) to which this proposal has been/will be submitted.

Support: Current Pending Submission Planned in Near Future *Transfer of Support

Project/Proposal Title:

REU Site: Tackling the Grand Challenges of Engineering

Source of Support: National Science Foundation

Total Award Amount: \$327,347

Total Award Period Covered: 2010-2013

Location of Project: Purdue University, West Lafayette

Person-Months Per Year Committed to the Project.

Cal:

Acad:

Sumr:



Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Carrie A. Wachter Morris
Other agencies (including NSF) to which this proposal has been/will be submitted:
None

Support: Current Pending Submission Planned in Near Future *Transfer of Support
Project/Proposal Title: Digital Disaster Curriculum

Source of Support: Instructional Technology at Purdue, Purdue University

Total Award Amount: \$15,000

Total Award Period Covered: June 2009 – May 2010

Location of Project: West Lafayette, IN

Person-Months Per Year Committed to the Project.

Cal: 1.5

Acad:

Sumr: 1

Support: Current Pending Submission Planned in Near Future *Transfer of Support
Project/Proposal Title: Creating a Concerned Engineer in a Changing Environment

Source of Support: Purdue University's Engineer of 2020 Seed Grant Program

Total Award Amount: \$40,000

Total Award Period Covered: May 2010 – April 2011

Location of Project: West Lafayette, IN

Person-Months Per Year Committed to the Project.

Cal: 1

Acad:

Sumr: 1

Support: Current Pending Submission Planned in Near Future *Transfer of Support
Project/Proposal Title: CCECE: Creating a Concerned Engineer in a Changing Environment

Source of Support: NSF

Total Award Amount: \$ 399,920.35

Total Award Period Covered: 2010-2012

Location of Project: Purdue University West Lafayette, IN

Person-Months Per Year Committed to the Project.

Cal:

Acad:

Sumr: 1

Support: Current Pending Submission Planned in Near Future *Transfer of Support
Project/Proposal Title:

Source of Support:

Total Award Amount: \$

Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project.

Cal:

Acad:

Sumr:

Support: Current Pending Submission Planned in Near Future *Transfer of Support
Project/Proposal Title:

Source of Support:

Total Award Amount: \$

Total Award Period Covered:

Location of Project:

Person-Months Per Year Committed to the Project.

Cal:

Acad:

Sumr:

*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.



Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Nicole Weber	Other agencies (including NSF) to which this proposal has been/will be submit-
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: "Labeling" of Consumer Products: Assessing the Effectiveness of an Unconventional Way of Introducing Engineering into Everyday Life Source of Support: National Science Foundation Total Award Amount: \$449,981 Total Award Period Covered: 2010-2013 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: sPBL in Engineering: Integrating Service-Learning and Problem-Based Learning to Infuse Engineering as a Caring Discipline into High-Schools Source of Support: National Science Foundation Total Award Amount: \$3,489,936 Total Award Period Covered: 2010-2015 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: INSPIRE 2 STEP FORWARD in ENGINEERING Source of Support: National Science Foundation Total Award Amount: \$1,387,711.12 Total Award Period Covered: 2010-2014 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: Creating a Concerned Engineer in a Changing Environment Source of Support: National Science Foundation Total Award Amount: \$399,920 Total Award Period Covered: 2010-2013 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: Pilot Study: Creating a Concerned Engineer in a Changing Environment Source of Support: Purdue's Engineer of 2020: 2010-2011 Seed Grant Program Total Award Amount: \$40,000 Total Award Period Covered: 2010-2011 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.	



Current and Pending Support

(See GPG Section II.D.8 for guidance on information to include on this form.)

The following information should be provided for each investigator and other senior personnel. Failure to provide this information may delay consideration of this proposal.

Investigator: Melissa Dyehouse	Other agencies (including NSF) to which this proposal has been/will be submit-
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: "Labeling" of Consumer Products: Assessing the Effectiveness of an Unconventional Way of Introducing Engineering into Everyday Life Source of Support: National Science Foundation Total Award Amount: \$449,981 Total Award Period Covered: 2010-2013 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: sPBL in Engineering: Integrating Service-Learning and Problem-Based Learning to Infuse Engineering as a Caring Discipline into High-Schools Source of Support: National Science Foundation Total Award Amount: \$3,489,936 Total Award Period Covered: 2010-2015 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: INSPIRE 2 STEP FORWARD in ENGINEERING Source of Support: National Science Foundation Total Award Amount: \$1,387,711.12 Total Award Period Covered: 2010-2014 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: Creating a Concerned Engineer in a Changing Environment Source of Support: National Science Foundation Total Award Amount: \$399,920 Total Award Period Covered: 2010-2013 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
Support: <input type="checkbox"/> Current <input checked="" type="checkbox"/> Pending <input type="checkbox"/> Submission Planned in Near Future <input type="checkbox"/> *Transfer of Support Project/Proposal Title: Creating a Concerned Engineer in a Changing Environment Source of Support: Purdue's Engineer of 2020: 2010-2011 Seed Grant Program Total Award Amount: \$40,000 Total Award Period Covered: 2010-2011 Location of Project: Purdue University Person-Months Per Year Committed to the Project. Cal: 6 Acad: Sumr:	
*If this project has previously been funded by another agency, please list and furnish information for immediately preceding funding period.	

