Curriculum Vitae

Daniela Faas, Ph.D.

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Education

Ph.D., Mechanical Engineering and Human-Computer Interaction, May 2010
Iowa State University, Ames, IA
Dissertation title: "A Hybrid Method of Haptic Feedback to Support Virtual Product Assembly"
Advisor: Professor Judy M. Vance

M.S., Mechanical Engineering, August 2006
Bucknell University, Lewisburg, PA
Thesis title: "3D Reconstruction and Nonlinear FEA of the Embryonic Left Ventricle"
Advisor: Professor Christine M. Buffinton

B.S., Mechanical Engineering, and **B.A.,** International Relations, May 2005
Bucknell University, Lewisburg, PA

Positions & Employment

Teaching Experience

Harvard University, Cambridge MA

Senior Preceptor in Design Instruction, John A. Paulson School of Engineering and Applied Sciences, July 2012 – present

Role: Develop the design-engineering component of the SEAS curriculum in conjunction with faculty and staff.

- Teaching and planning: teach ES 51 as the principal instructor; co-teach ES 100 with other faculty members; TA/TF recruitment and supervision of teaching staff and TAs/TFs; course website maintenance, scheduling, facilities readiness, software availability, etc.; advise and work closely with students on design projects within the curriculum, including senior capstone projects; and advise students on extra-curricular activities and design projects.
- Curriculum development: develop the design engineering component of the SEAS curriculum in conjunction with faculty and staff including short and weeklong design workshops; assist faculty and senior administrators with strategic planning for SEAS Allston development; develop relationships with external partners to attract real-world design projects that translates to design-engineering opportunities for SEAS students and help to link individual students to design-related projects in faculty laboratories.
- Service and administrative: supported and serve das instructor to summer program in Hong Kong and at Harvard; undergraduate advising and mentoring including serving as a freshman advisor; develop and coordinate ABET assessments across mechanical engineering courses.

Course: ES51 Computer Aided Machine Design, Spring 2013 - present
Role: Principal instructor, TA/TF recruitment and supervision of teaching staff, including TAs/TFs; course website maintenance, scheduling, facilities readiness, software availability, etc.;

- # of Students: 34 -60 (Freshman through Seniors).

- Taught lecture and lab to both engineering and non-concentrators. Was solely responsible for course content. Completely redesigned ES51 to focus on machine design and improving hands-on component of lecture and lab.
- Evaluated highly by students for stimulating interested in mechanical engineering and positive learning environment.

Course: ES 100 Senior Design

Role: Co-instructor and section instructor, course website maintenance, scheduling, facilities readiness, software availability, etc.; advise and work closely with students on design projects within the curriculum; and advise students on extra-curricular activities and design projects.

- # of Students: 34 (Seniors) in 2012- 2013, 54 (Seniors) in 2013-2014. 45 (Seniors) in 2015-2016

MIT, *Cambridge MA*

Instructor, Mechanical Engineering Department, Fall 2010 – Spring 2012

Course: Instrumentation and Measurement (ME 2.671), Fall 2010

Role: Lab instructor, responsible for grading of lab and final project reports. Advised students on semester long measurement projects. # of Students: 28 (Juniors).

Course: Design and Manufacturing I (ME 2.007), Spring 2011, Spring 2012

Role: Lab Instructor, responsible for inventory of entire course (160 students). Developed and managed related budgets and administrative planning. TA/TF recruitment and supervision of teaching staff. Developed and maintained course website. Developed new course material.

- # of Students: 32 (Freshman, Sophomores).

Mentor, Mechanical Engineering Department

Course: Senior Design (ME 2.009), Fall 2011

Role: advise and work closely with students on design projects.

Course: Senior Design (ME 2.00), Fall 2013

Role: advise and work closely with students on design projects.

Iowa State University, *Ames IA*

Instructor, Mechanical Engineering Department, Fall 2008, Spring 2010

Course: Engineering Graphics and Introductory Design (ENG 170)

Role: Fully responsible for course development and all aspects of instruction (including syllabus and lecture development, grading). # of Students: 38 (freshman, sophomores).

Preparing Future Faculty Scholar*,* Fall 2007 - Fall 2008

Organizer*,* Iowa State University, August 20th, 2008

Role: Organized sessions for Teaching Assistants Orientation

Guest Lecturer, Fall 2007-Spring 2009

Course: Thermodynamics for Chemical Engineers (ChEng381)

Course: Mass Transfer (ChEng210)

Bucknell University, *Lewisburg PA*

Teaching Assistant, Fall 2004 - Spring 2005

Course: Computer-Aided Design (ME 202)

Role: Supervised CAD labs, graded lab assignments. # of Students: 35 (Sophomores).

Course: Thermodynamics I (ME 216)

Role: Supervised thermo labs, graded homework and lab assignments. # of Students: 35 (Juniors).

Research Experience

MIT, Cambridge MA

Research Associate, Mechanical Engineering Department, July 2012 – present
Postdoctoral Associate, Mechanical Engineering Department, July 2010 – July 2012

- Advisor: Daniel D. Frey
- Role: Researcher in newly created International Design Center with Singapore University of Technology and Design.
- Topics: Engineering decision making, design innovation, engineering education, Virtual Reality.

Iowa State University, Ames IA

Research Assistant, Mechanical Engineering Department, 2006-2010

- Role: Developed new method to combine haptic force feedback with geometric constraint recognition
- Topics: Virtual Reality, CAD, haptic force feedback, geometric constraint recognition.

Bucknell University, Lewisburg PA

Research Assistant, Mechanical Engineering Department, 2004-2006

- Reconstructed embryonic left ventricle from image data and performed non-linear finite element analysis. Analyzed and published results.
- Research focus areas included: Biomedical imaging, stress strain analysis, nonlinear material behavior.

Industrial Experience

Engineering Intern, Tyco Electronics, Bensheim, Germany, Summer 2004

- Role: Conducted experiments to determine mechanical and electrical properties of action pins. Prepared directives, presentations and technical documents in German and English. Interacted with customers on engineering projects. Created parts and assemblies in ProEngineer.

Engineering Intern, BASF, Ludwigshafen, Germany, Summer 2003

- Role: Conducted FE Analysis with FePipe to examine stress in pressure vessels. Prepared presentations, technical documents with translations in both German and English. Involved in planning new designs for piping and pressure vessels for industrial plants.

Research Intern, Darmstadt University of Technology, Darmstadt, Germany, Summer 2002

- Role: Assisted in experimental setups, measurements, and graphical documentation for materials research. Organized presentations for conferences held in Germany and China. Prepared setups for static and cyclic high temperature experiments. Registered technical documents into database.

Areas of Interests

Virtual Reality, Finite Element Analysis, Biomechanics, Computer Aided Design, Human Computer Interaction, Optimization, Biomedical Engineering, Engineering Education.

Awards and Honors

Worcester Academy Varsity Club Award Recipient, 2016
Spot Award for outstanding service to the Mechanical Engineering Department, MIT, Spring 2012
Shapiro Post-Doctoral Fellow, MIT, Fall 2010-Spring 2011

Seward, Ratcliffe, and Galloway Foundation Mechanical Engineering Fellow, Iowa State University, Fall 2008.
Phi Kappa Phi (All-Discipline Honor Society).
Tau Beta Pi (Engineering Honor Society).

Publications

Journal Publications

1. Buffinton, C., **D. Faas,** and D. Sedmera. Stress and Strain in Load-dependent Remodeling of the Embryonic Left Ventricle Assessed by Finite Element. Biomechanics and Modeling in Mechanobiology: Volume 12, Issue 5 (2013), Page 1037-1051
2. **D. Faas**, Q. Bao and M.C. Yang. The Influence of Immersion and Presence in Early Stage Engineering Designing and Building. Artificial Intelligence for Engineering Design, Analysis and Manufacturing (AIE-2013-021), 2013.

Peer-Reviewed Conference Proceedings

1. Q. Bao, **D. Faas** and M.C. Yang. Benefits and Limitations of Sketching & Prototyping in Early Stage Design. In Preparation to The Fourth International Conference on Design Creativity (4th ICDC), 2016.
2. **D. Faas**, S. Gong. Improving Novelty and Quality during introductory mechanical design competitions. Proceedings of ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC16-59251).
3. C. Lombardo**, D. Faas**, A. Uttamchandani. Improving Design Competency in Introductory Engineering Courses within a General Education Requirement. Proceedings of ASEE Annual Conferen*ce, New Orleans, LA,* 2016 (ASEE2016-15839).
4. G. Hein, M. Verstraete, D. Peters, A. Lucietto, D. Obannon, **D. Faas**, J. Nagel. The Changing Role of Professional Societies for Academics. Proceedings of ASEE Annual Conference, New Orleans, LA, 2016 (ASEE2016-375625).
5. **D. Faas,** R.D. Howe. Case Study for Introductory Mechanical Design Competitions. Proceedings of ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Boston MA (IDETC2015-47286).
6. C. Lombardo**, D. Faas**, A. Uttamchandani, E. Hu. Self-Directed Summer Design Experience Across Disciplines and the Globe. Proceedings of ASEE Annual Conferen*ce, Seattle WA* 2015 (ASEE2015-13243).
7. **D. Faas**, Q. Bao and M.C. Yang. Preliminary Sketching and Prototyping: Comparisons in Exploratory Design-and-Build Activities. Proceedings of ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Buffalo NY (DETC2014-34928).
8. **Faas D.**, D. Frey. Quickly Building Students' Confidence in their Fabrication Abilities. Proceedings of ASEE Annual Conferen*ce, Atlanta GA* 2013 (ASEE2013-5823).
9. **Faas, D.**. A Hybrid Method for Haptic Feedback to Support Manual Virtual Product Assembly. Proceedings of ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC2011-47665).
10. **Faas, D.,** and J.M. Vance. BREP Identification during Voxel-Based Collision Detection for Haptic Manual Assembly. Proceedings of ASME 2011 World Conference on Innovative Virtual Reality 2011 (WINVR2011-5524).
11. **Faas, D.,** and J.M. Vance. Assessment of PointShell Shrinking and Feature Size on Virtual Manual Assembly. Proceedings of ASME 2010 World Conference on Innovative Virtual Reality, Ames, IA (WINVR2010-3765).

12. Marsh, E., **D. Faas**, D. Niedergeses, and K. Whitney. A Preliminary Incongruent Movement Study in an Immersive Virtual Reality Setting. Proceedings of Emerging Technologies Conference 2009, Ames, IA (ETC2009-0030).
13. **Faas, D.,** and J.M. Vance. Interactive deformation through Mesh-free Stress analysis in virtual Reality. Proceedings of ASME 2008 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, New York, NY (IDETC2008-50084).
14. **Faas, D.,** A. Fischer, and J.M. Vance. Interactive Mesh-Free Stress Analysis for Mechanical Design Assembly with Haptics. Proceedings of ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Las Vegas, NV (IDETC2007-34660).
15. **Faas, D.,** C. Buffinton, and D. Sedmera. 3D Reconstruction and Nonlinear Finite Element Analysis of the Embryonic Left Ventricle. Proceedings of the ASME 2007 Summer Bioengineering Conference, Keystone Resort & Conference Center, Keystone, Colorado, USA (SBC07-176837).
16. Buffinton, C., **D. Faas**, and D. Sedmera. 3D Reconstruction and Finite Element Stress/Strain Analysis of the 6-d Chick Heart. 2006 Weinstein Cardiovascular Development Conference, St. Pete Beach, FL.

Other Publications

1. Faas, D. A Hybrid Method of Haptic Feedback to Support Virtual Product Assembly. Mechanical Engineering and Human-Computer Interaction. Ames, IA, Iowa State University. Ph.D., 2010.
2. Faas, D. 3D Reconstruction and Nonlinear Finite Element Analysis of the Embryonic Left Ventricle. Mechanical Engineering. Lewisburg, PA, Bucknell University. M.S.: 215, 2006.

Poster Presentations

Design Computing and Cognition DCC'12. **D. Faas**, D. Frey and M. C. Yang.
Title: Analysis of Immersion and Presence and its Role in Early Stage Engineering Design.
ASME 2010 World Conference on Innovative Virtual Reality, Ames, IA.
Title: A hybrid Method of Haptic Feedback to Support Virtual Product Assembly
John Deere Day 2009, Virtual Reality Applications Center, Iowa State University, Ames IA
Title: A Hybrid Method to Support Natural Interaction of Parts in a Virtual Environment
Emerging Technologies Conference 2009, Ames, IA
Title: A hybrid method of Haptic Feedback to Support Virtual Product Assembly
John Deere Day 2008, Virtual Reality Applications Center, Iowa State University, Ames IA
Title: Virtual Manufacturing and Assembly
2006 Weinstein Cardiovascular Development Conference, St. Pete Beach, FL.
Title: 3D Reconstruction and Finite Element Stress/Strain Analysis of the 6-d Chick Heart

Selected Speaking Engagements

Invited Seminar Speaker (March 10th, 2011), Mechanical Engineering Department, Tufts University
Title: A Hybrid Method of Haptic Feedback to Support Virtual Product Assembly
Speaker (May 13th, 2010), Lightning Talk, Ignite Ames, IA
Title: HCI Implications of SCUBA diving (available on YouTube)
Speaker (March 12th, 2009), 1st Graduate Research Competition, Mechanical Engineering Department, Iowa State University
Title: A Hybrid Method of Haptic Feedback to Support Virtual Product Assembly
Speaker (August 20th, 2008), Sessions for Teaching Assistants, Center for Excellence in Teaching and Learning, Iowa State University

Title: Life in Iowa: Community & University Resources
Title: Advice for International Students

Invited Seminar Speaker (March 10th, 2008), Society of Women Engineers, Iowa State University
Title: Graduate School Panel Discussion

Invited Seminar Speaker (September 16th, 2006), Mechanical Engineering Department, Iowa State University
Title: 3D Reconstruction and Nonlinear Finite Element Analysis of the Embryonic Left Ventricle

Grant writing experiences

NSF GOALI Grant #0928774: "GOALI: A Hybrid Method to Support Natural Interaction of Parts in a Virtual Environment," PI: Judy M. Vance, Co-PI: Lee Birch (John Deere) and Stephen Gilbert, $300,000, 2009.

Internal Service

Freshman Advisor, Fall 2013-current
Allston Planning Committee (Community and Teaching Labs), Fall 2014- present
Undergraduate Engineering Subcommittee: ABET accreditation, Spring 2013-current
Engineering Design Committee, Fall 2012-current

External Service

2016 NSF Graduate Research Fellowship Program (GRFP)
Judge, 2015 Collegiate Inventors Competition
SWE Women In Academia committee members, June 2015- present
Board of Visitors, Worcester Academy, September 2013- present
Chair of the ASME IDETC/CIE VES, 2014
Program Committee Member, CE2014, CE2015 (The ISPE International Conference on Concurrent Engineering)
Symposium Co-Organizer for ASME IDETC/CIE VES, 2013
Review Coordinator for ASME IDETC/CIE VES, 2013, 2014
Session Chair for ASME IDETC/CIE VES13-1, 2013
Session Co-Chair for ASME IDETC/CIE VES Session 1, 2010.
Reviewer for ASME WinVR, 2010, 2011.
Reviewer for ASME IDETC-DAC and CIE Conference, 2008, 2009, 2010, 2011, 2012, 2013.
Reviewer for IEEE Virtual Reality Conference, 2009, 2011.
Reviewer for International Symposium on Tools and Methods of Competitive Engineering, 2010, 2011
Graduate Representative, Society of Women Engineers, Iowa State University, Spring 2009.
Mechanical Engineering Graduate Student Advisory Board, Spring 2008.
Inaugural President, Mechanical Engineering Graduate Student Organization, Spring 2008.

Students Advised

Senior Thesis, Harvard University

Lexie Schachne (S.B., Mechanical Engineering), Breaking system for Long boards, Spring 2016
Lukas Bielskis (S.B., Mechanical Engineering), Smart Sound-Activated Dog Treat Dispenser, Spring 2014
Shanna Wiggins (S.B., Mechanical Engineering), Stretcher Add-On to Aid in First Responder Lifting Tasks, Spring 2014

Rachel Davidson (S.B., Mechanical Engineering), Equipment Case for Firefighter Rapid Interventions Crews (RICs), Spring 2014
Kristin Barclay (S.B., Electrical Engineering), A Wearable Sensor to Prevent Heat Exhaustion in Firefighters, Spring 2014
Megan Fazio (S.B., Electrical Engineering), Softball Pitch Speed Tracker, Spring 2013
Nancy De Haro (S.B., Mechanical Engineering), DIY Evaporative Coolers, Spring 2013

Independent Research (ES91r), Harvard University

Harrison Becker, Prosthetic Hand, Fall 2015
Fedor Garin, Electric Skateboard, Spring 2013

Undergraduate Research Opportunity (UROP), MIT

Nathan Porter (S.B., Mechanical Engineering), Wii-Mote Controlled Robot, Spring 2013

Professional Registration

Fundamentals of Engineering Certificate, Pennsylvania, April 2004

Workshops and Conferences

NSF Workshop on Networking Skills, Montreal, Quebec, Canada, August 14, 2010.
SWE National Conference, Long Beach, CA October 15-17, 2009.
NSF workshop on Negotiation Skills, San Diego, August 31, 2009.
SWE National Conference, Baltimore, MD November 6-8, 2008.
SWE National Conference, Nashville, October 25-27, 2007.
Altair Engineering, Modeling and Results Visualization, July 27, 2005.
Visage Imaging, AMIRA Visualization Workshop, May 10, 2005.

Professional Organizations

Member of American Society of Mechanical Engineers (ASME).
Member of Society of Women Engineers (SWE).
Member of American Society of Engineering Education (ASEE).

Technical Skills

OS: Windows, Sun / Unix, Mac.
Software: Microsoft Office, ProEngineer, SolidEdge, SolidWorks, HyperMesh, ProManufacturing, ANSYS, ABAQUS, LS-DYNA, Tahoe, Amira, Working Model, FePipe, CAESAR II, Minitab, Sigmaplot, MathCad, LabVIEW, Arduino.
Programming: C++, HTML, MATLAB, Arduino, OpenGL, OpenSceneGraph, OpenCV, VrJuggler, D-Cubed, VPS, JTOpenToolkit, OpenHaptics, ARToolkit.
Languages: Fluent in both verbal and written German and English. Basic Spanish, French, Italian, and Latin.

Other Activities

2nd Place for Innovation, Visualization and Interaction Challenge, Emerging Technologies Conference 2009
Assistant Scuba Instructor, CPR and Oxygen Administrator certified.
Letter Winner, Women's Swimming and Water Polo, 2000 – 2004 at Bucknell University.
Received Margaret L. Bryan Award (best dual athlete) at Senior Awards 2004.
Bucknell Women's Swimming Most Valuable Player, 2002.

Received All-Patriot League Honors (1st team) in Swimming, 2001, 2002, 2003, 2004.
Received International Awareness Award, 2001, 2002 from Bucknell University.