Michael Hoefer — Curriculum Vitae

Education

PhD University of Colorado Boulder, Computer Science and Cognitive Science — Expected May 2024
Advisor: Stephen Voida

MS University of Colorado Boulder, Computer Science — May 2022
Prelim Exam: *Personal Informatics Systems for Self-Development*

MS Iowa State University, Industrial and Manufacturing Systems Engineering — May 2017
Thesis: *Automated Design for Manufacturing and Supply Chain Using Geometric Data Mining and Machine Learning*

BS Iowa State University, Industrial Engineering — Dec 2015
College of Engineering Valedictorian
Honors Thesis: *Wind Turbine Blade Recycling: An Economic Decision Framework*

Grants, Fellowships, and Awards

CSCI Department Summer Fellowship ($6,000) — 2023
University of Colorado Boulder, Department of Computer Science

Outstanding Graduate Instructor Teaching Recognition Awards ($1,000) — 2023
University of Colorado Boulder, Graduate School and Department of Computer Science

Research Paper Award ($500) — 2023
University of Colorado Boulder, Department of Computer Science
Awarded to six student lead authors of impactful published papers *[J.5]*

Institute of Cognitive Science Travel Award ($500) — 2023
University of Colorado Boulder, Institute of Cognitive Science
Conference: *ACM DIS Conference on Designing Interactive Systems '23*

Graduate School Conference Travel Award ($450) — 2023
University of Colorado Boulder, Graduate School
Conference: *ACM DIS Conference on Designing Interactive Systems '23*

Institute of Cognitive Science Research Award ($500) — 2022
University of Colorado Boulder Institute of Cognitive Science
Proposal: *Personal Financial Informatics: Reflecting on and Visualizing the Use of Money in Daily Life*

Conference Support Fellowship ($1,200) — 2022
University of Colorado Boulder, Department of Computer Science
Conference: *ACM CHI Conference on Human Factors in Computing Systems '22*

Institute of Cognitive Science Travel Award ($500) — 2022
University of Colorado Boulder, Institute of Cognitive Science

David T. Spalding Graduate Teaching Fellowship ($1,000) 2022
University of Colorado Boulder, College of Engineering and Applied Sciences

Institute of Cognitive Science Research Award ($500) 2021
University of Colorado Boulder Institute of Cognitive Science
Proposal: *Exploring a Participatory Network Methodology for Assessing Human Need*

Graduate Student Travel Award ($100) 2021
University of Colorado Boulder Graduate and Professional Student Government
Conference: *Networks 2021*

Beverley Sears Graduate Student Grant Award ($1,000) 2020
University of Colorado Boulder
Proposal: *Towards Personal Dream Informatics: Exploring the Self-Tracking of Dreams*

Hack-CU Hackathon Winner, Social Impact Track 2020
University of Colorado Boulder
Project: *Empowering Interpersonal Informatics*

Dean's Graduate Assistantship 2019
University of Colorado Boulder

Meritorious Invention Award 2019
The Boeing Company
Invention: "An Automated Method for Dynamic Manufacturing Scheduling
Using Machine Learning and Historical Learning Curve Analysis"

Best Track Paper, Manufacturing and Design Division 2017
Institute of Industrial and Systems Engineers (IISE) Conference and Expo
Title: "Automated Manufacturability Analysis during Conceptual Design"

Best Oral Presentation Award 2017
Iowa State Graduate and Professional Student Research Conference
Title: "Automated Design for Manufacturing and Supply Chain"

Peer Reviewed Journal Papers and Published Conference Papers

In press:

[J.8] Markum, R., Wolf, S., Claisse, C., and **Hoefer, M**. "Mediating the Sacred: Configuring a Design Space for Religious and Spiritual Tangible Interactive Artifacts," to appear in *TEI '24: ACM Conference on Tangible Embedded and Embodied Interaction*, Feb 11–14, 2024, Cork, Ireland.
Acceptance rate: 25.7%

Published*:*

[J.7] **Hoefer, M.** and Voida, S. "Being, Having, Doing, and Interacting: A Personal Informatics Approach to Understanding Human Need in Everyday Life," in *DIS '23: ACM Conference on Designing Interactive Systems*, July 10–14, 2023, Pittsburgh, PA.

https://doi.org/10.1145/3563657.3596120
Acceptance rate: 24%

[J.6] **Hoefer, M.** and Voida, S. "Tracking the Experience of Self in Everyday Life," in *CHI '23: Conference on Human Factors in Computing Systems (Late Breaking Work)*, April 23–28, 2023, Hamburg, Germany. (Short Paper)
https://doi.org/10.1145/3544549.3585785
Acceptance rate: 34.0%

[J.5] **Hoefer, M.**, Schumacher, B., and Voida, S. "Personal Dream Informatics: A Self-Information Systems Model of Dream Engagement," in *CHI '22: Conference on Human Factors in Computing Systems*, April 30–May 06, 2022, New Orleans, LA. 24 pages.
https://dl.acm.org/doi/10.1145/3491102.3517669
Acceptance rate: 24.7%

[J.4] **Hoefer, M.**, Schumacher, B., Szafir, D., and Voida, S. "Visualizing Uncertainty in Multi-Source Mental Health Data," in *CHI '22: Conference on Human Factors in Computing Systems (Late Breaking Work)*, April 30–May 06, 2022, New Orleans, LA. 6 pages. (Short paper)
https://doi.org/10.1145/3491101.3519844
Acceptance rate: 31.6%

[J.3] **Hoefer, M.**, Van Kleunen, L., Goodby, C., Blackburn, L., Panati, P., and Voida, S. "The Multiplicative Patient and the Clinical Workflow: Clinician Perspectives on Social Interfaces for Self-Tracking and Managing Bipolar Disorder," In *ACM Designing Interactive Systems (DIS) '*21, June 28–July 2, 2021, Everywhere, Earth. ACM, New York, NY, USA.
https://doi.org/10.1145/1122445.1122456
Acceptance rate: 24.5%

[J.2] Morgan, A., Way, F., **Hoefer, M.**, Larremore, D., Galesic, M., and Clauset, A. "The Unequal Impact of Parenthood in Academia," *Science Advances.* 7 (9) eabd1996, 2021.
https://doi.org/10.1126/sciadv.abd1996
Five-year impact factor: 16.9

[J.1] **Hoefer, M.** and Frank, M. "Automated Manufacturing Process Selection During Conceptual Design," *ASME Journal of Mechanical Design*. 140.3 (2018): 1–12.
https://doi.org/10.1115/1.4038686
Five-year impact factor: 3.5

Lightly Peer Reviewed Papers (Workshop Papers and Non-CS Conference Papers)

[W.4] **Hoefer, M.** and Voida, S. "Interfacing with Network Representations of the Self and Needs," *Self-Determination Theory in HCI: Shaping a Research Agenda, Workshop @ CHI 2022*.

[W.3] **Hoefer, M.** and Voida, S. "Faith Informatics: Computing for Development Through Stages of Faith," *Integrating Faith, Religion, and Spirituality in HCI, Workshop @ CHI 2022*.

[W.2] **Hoefer, M.**, Chen, N., and Frank, M. "Automated Manufacturability Analysis for Conceptual Design in New Product Development," *Proceedings of the 2017 Industrial and Systems*

Engineering Research Conference, Pittsburg, PA, May 2017. Presenter: Hoefer.
https://lib.dr.iastate.edu/imse_conf/194/

Best track paper, Manufacturing & Design Division

[W.1] **Hoefer, M.**, Frank, M., and Dorneich, M., "Geometric Analysis to Automate Design for Supply Chain," *Proceedings of the 2017 Industrial and Systems Engineering Research Conference*, Pittsburg, PA, May 2017. Presenter: Hoefer.
https://lib.dr.iastate.edu/imse_conf/191/

Workshops Organized

[WO.1] Markum, R., Wolf, S., **Hoefer, M**., and Maas, F. "Designing Tangible Interactive Artifacts for Religious and Spiritual Purposes," *DIS '23: ACM Conference on Designing Interactive Systems*, July 10–14, 2023, Pittsburgh, PA.

Lightly Peer-Reviewed Conference Presentations and Posters (Unpublished)

[C.8] **Hoefer, M.** and Voida, S. "Representing Systems of Need and Satisfaction," *Workshop on Visualization for Social Good @ IEEE VIS 2021*. Lightning Talk.

[C.7] **Hoefer, M.** and Voida, S. "A Network Visualization of Sustainable Consumption Corridors," in *Proceedings of IEEE Conference on Visualization and Visual Analytics (Extended Abstracts)*, Virtual, 2021. (Poster).

[C.6] **Hoefer, M.** and Voida, S. "The Individual as a Network: Multilayer Intra-Individual Ego Networks," *Networks 2021*, Washington, D.C., July 2021.

[C.5] **Hoefer, M.** "Finding the Cutting Edge: How Network Science Informs Intra-Organizational Mobility," *Networks 2021*, Washington, D.C., July 2021. (Poster).

[C.4] **Hoefer, M.** "Networks for Understanding Human Need," *International Conference on Computational Social Science (IC^2S^2)*, Cambridge, MA, July 2020. (Poster).

[C.3] Morgan, A., Way, S., **Hoefer, M.**, Galesic, M., Larremore, D., Clauset, A. "The Unequal Impact of Parenthood in Academia," *International Conference on Computational Social Science, Cambridge*, MA, July 2020. Presenter: Morgan.

[C.2] **Hoefer, M.**, Chen, N., and Frank, M. "Automated Manufacturability Analysis for Conceptual Design in New Product Development," *2017 Industrial and Systems Engineering Research Conference*, Pittsburg, PA, May 2017. Presenter: Hoefer.
Best track paper, Manufacturing & Design Division

[C.1] **Hoefer, M.**, Frank, M., and Dorneich, M., "Geometric Analysis to Automate Design for Supply Chain," *Industrial and Systems Engineering Research Conference*, Pittsburg, PA, May 2017. Presenter: Hoefer.

Trade Magazine Articles

[T.1] **Hoefer, M.**, Voida, S., and Mitchell, R. "Faith Informatics: Supporting Development of Systems of Meaning-Making with Technology," *ACM Interactions*, Jul 2022.

https://interactions.acm.org/blog/view/faith-informatics-supporting-development-of-systems-of-meaning-making-with

Theses and Other Research Publications

[O.3] Hoefer, M., "Automated Design for Manufacturing and Supply Chain Using Geometric Data Mining and Machine Learning," *Graduate Theses and Dissertations*. (2017). 15320. https://doi.org/10.31274/etd-180810-4948

[O.2] Hoefer, M. "Wind Turbine Blade Recycling: An Economic Decision Framework," Honors Project and thesis. (2015).
Poster: https://lib.dr.iastate.edu/honors_posters/201512/projects/9/
Paper: http://doi.org/10.13140/RG.2.2.28393.90723

[O.1] Hoefer, M. "Utilizing Data Mining and Spatial Analysis to Evaluate the Effects of Mineral Extraction on Water Quality in South Africa," RWTH Aachen UROP Research Paper. (2014). http://doi.org/10.13140/RG.2.2.32142.25926

Engineering and Research Experience

University of Colorado Boulder, Dept. of Computer Science, Boulder, CO Aug 2020 to Present
PhD Student – Too Much Information Lab (Dr. Stephen Voida)

- Conducting an independent research agenda on personal informatics for human development
- Advising two masters students in creating a flexible application for reflection on time use**,** utilizing natural language processing and information visualization to support personal development
- Designed and led a survey study (N=281) to understand engagement with dreaming, creating a new model of dream engagement and the first known application of system dynamics modeling to HCI *[J.5]*
- Designed a combination RCT and qualitative study to assess how technology can mediate empathic accuracy *[J.4] (study in progress)*
- Developed a scalable interpersonal informatics system for supporting individuals with bipolar disorder, using AWS Cognito, Lambda, and DynamoDB integrated with a React front end
- Conducted qualitative semi-structured interviews with mental health clinicians to evaluate the design of a self-tracking application for individuals with bipolar disorder *[J.3]*

University of Colorado Boulder, Dept. of Computer Science, Boulder, CO Aug 2019 to May 2020
Graduate Research Assistant – Larremore/Clauset Lab

- Led crowd sourcing effort to gather research data using Mechanical Turk and Python scripts
- Analyzed social science survey data in Python (Pandas), including a stratified sampling algorithm and statistical tests for representativeness (chi-squared and KS tests) *[J.2]*
- Performed experiments to assess validity of automated CV parsing tools (Python)
- Curated a novel dataset on accredited sociology departments and faculty using PDF parsing (Python)

Prior to returning to graduate school, I worked in industry as an industrial engineer and data scientist.

Boeing Commercial Airplanes, Charleston, SC Jan 2019 to July 2019

Production Data Scientist

- Final role in the Engineering Career Foundation Program, a leadership rotational program
- Developed automated learning curve dashboards and analytic tools in R (Shiny)
- Led process improvement efforts using design changes, process mapping, tool development, and R&D applications to improve manufacturability of the 787, providing labor and material savings of over $50,000 annually

Boeing AvionX Production, Operations, and Quality, Various Locations Jan 2018 to Dec 2018
Lead Industrial Engineer

- Provided technical leadership on the development of a new, high-rate production system
- Led design for manufacturing, assembly, and test (DFMA) efforts for new product development. Resulting design changes expected to result in 50% reduction in process flow time
- Developed lean manufacturing strategy utilizing point of use material storage, dynamic line balancing, and single piece flow to meet aggressive production goals
- Created functional design of new electronic assembly facility, include 2D and 3D mockups
- Modeled production system using 3D discrete event simulation software (Flexsim), simulating and optimizing 30+ years of factory operations for multiple production facilities

Boeing Global Services (BGS) Emergent Build Center, Seal Beach, CA Jul 2017 to Dec 2017
Industrial Engineer

- Researched and implemented automatic data collection system for overall equipment effectiveness (OEE) to improve machine capacity, utilization, and efficiency
- Developed standardized quality metrics across all BGS manufacturing sites, and automated reporting through an interactive Tableau dashboard utilizing cross-database SQL queries
- Created a suite of SharePoint applications to manage shop floor operations, including machine scheduling, part tracking, and tooling management
- Led culture change effort to evaluate and improve the productivity measurement methodology used for knowledge work

Iowa State University, Dept. of Industrial Engineering, Ames, IA Aug 2015 to May 2017
Graduate Research Assistant

- Developed automated methods of extracting geometry-based metrics of CAD models, and applied machine learning to classify models based on manufacturing process *[J.1] [C.1] [O.3]*
- Collaborated with multi-national research team to create automated manufacturability software to reduce time and cost of product development cycles *[C.2]*
- Led integration and user interface team by developing a project vision and plan, including management of undergraduate and graduate students from diverse backgrounds
- Designed system architecture and database structure of distributed software application utilizing C#, C++, JSON, SQL databases, and CAD software

Boeing, Raw Materials Analytics, Bothell, WA May 2016 to Aug 2016
Analytics Intern

- Performed data analytics and visualization in R to characterize supplier ordering behaviors and develop service level pricing strategies for aluminum and titanium
- Determined optimal remnant size limits for metal cutting operations to reduce inventory and improve metal utilization, including simulations and analysis of nesting software
- Wrote an automated script that discovered $4.2 million worth of unusable material in inventory with a liquidation value of over $400,000

Boeing, Composite Manufacturing Center, Puyallup, WA May 2015 to Aug 2015
Industrial Engineering Intern

- Led cross functional team to implement automated warehouse storage for over 2000 parts, improving process time by 20% and saving significant labor costs while reducing ergonomic risks
- Designed and optimized warehouse layout using AutoCAD and warehouse management software
- Created and communicated project plan using Milestones Professional and Microsoft Project

RWTH Aachen, Aachen, Germany May 2014 to Aug 2014
Undergraduate Research Assistant

- Developed method to analyze water quality impacted by mining sites in South Africa *[O.1]*
- Programmed web scraping Python script to save over 200 hours of manual data collection
- Collaborated with multi-national research team to perform spatial data analysis in ArcGIS

Iowa State University, Dept. of Industrial Engineering, Ames, IA Sept 2013 to Dec 2014
Undergraduate Research Assistant

- Designed cost modeling tool for wind turbine blade end-of-life scenarios, completed as an honors thesis, "Wind Turbine Blade Recycling: An Economic Decision Framework" *[O.2]*
- Created and presented flight simulator for use in human computer interaction experiments, including development of a C++ plugin and documentation

Rockwell Collins, Decorah Operations, Decorah, IA Jan 2013 to Aug 2013
Industrial Engineering Co-op

- Researched, planned, and began implementation on a $220,000 selective solder capital equipment project, saving over $60,000 annually
- Managed weather radar avionics process failure mode effects analysis (PFMEA) team and completed over 200 risk reducing action items, resulting in a Rockwell Collins Lean Award
- Designed and procured over 50 tools, templates, and fixtures in AutoCAD to improve quality, cut costs, eliminate ergonomic issues, and improve safety

Zirous, Inc., Des Moines, IA May 2012 to Aug 2012
Application Developer Intern

- Revamped three Java EE internal business applications to improve usability, became familiar with many web development technologies
- Coordinated company wide application migration and provided continual user support

Rockwell Collins, Government Systems Software, Cedar Rapids, IA July 2009 to Aug 2011
Software Engineering High School Intern

- Led DXL (DOORS Extension Language) intern scripting team, wrote multiple time saving scripts.
- Teaching assistant for Rockwell Collins High School C++ Course, teaching lectures and providing individual assistance with programming assignments

TEACHING EXPERIENCE

University of Colorado Boulder, Boulder, CO May 2023 to August 2023
Graduate Instructor (GPTI), Human Computer Interaction and AI (CSCI 3002) *[Instructor of Record]*

- Redesigned HCI course structure and content to include system dynamics modeling, AI, and human-AI interaction
- Held seminar-style classes four days a week with 15 students

- Organized and led team including a TA and grader

University of Colorado Boulder, Boulder, CO June 2021 to Dec 2021, Aug 2022 to May 2023
Graduate Instructor (GPTI), Intro to Computer Science (CSCI 1300) *[Instructor of Record]*

- Instructed 256 students in spring '23, 360 students in fall '22, 187 students in fall '21, 33 students in summer '21
- Developed lecture material and lectured in hybrid format with in-person and remote attendees
- Organized team of 30+ teaching assistants to create assignments and provide student support

University of Colorado Boulder, Boulder, CO Aug 2020 to May 2021
Lead Graduate Teaching Assistant, Intro to Computer Science (CSCI 1300)

- Led five recitation sections, teaching 88 first year students how to think programmatically
- Developed course materials including homework, recitation activities, and project content
- Initiated and executed study-group matching process to help individuals find peers to learn with during pandemic

Iowa State University, Ames, IA Aug 2016 to Dec 2016
Graduate Teaching Assistant, Industrial Engineering

- TA for IE 432, Industrial Automation, an undergraduate course covering the following topics: circuit design and analysis, PLC programming, RFID, barcoding, transducers
- Taught weekly lab section, responsible for technical instruction and grading of coursework/quizzes

Iowa State University, Ames, IA Jan 2015 to May 2015
Undergraduate Teaching Assistant, Community Leadership and Public Service

- TA for CLPS 122, Leading with Purpose, an undergraduate course focused on developing leadership skills, personal development, and values-based behavior
- Assisted in developing course materials and grading homework assignments

Iowa State University, Ames, IA Aug 2014 to May2015
Tutor, Academic Success Center

- Tutored multiple students in STAT 231 (Probability and Statistical Inference for Engineers) and STAT 361 (Statistical Quality control)

Invited Talks

Research Talk, "Visualizing How We Live," CU Boulder Computer Science Open House, Spring 2023

Research Talk, "Designing technology to support co-tracking of mental wellbeing in bipolar disorder," Turing Institute, Data Science for Mental Health Interest Group, Spring 2023

Undergraduate Training, "Research Skills," University of Colorado Boulder, Undergraduate Research Program, Fall 2022.

Webinar, "Applying to PhD Programs," University of Colorado Boulder, Department of Computer Science, October 13th, 2020.

Leadership Development, "360 Mentoring," Boeing Annual Development Event, Oct 10, 2018.

Webinar, "Automated Manufacturability Analysis for Conceptual Design in New Product Development," Institute of Industrial and Systems Engineers, Jan 16, 2018.

Fundraising Speech, Marston Club Annual Dinner, Ames, IA, Fall 2014.

Technical Skills and Professional Training

Technical Skills

Languages used in projects: Python, C++, R (and Shiny), Javascript/HTML/CSS, C#, PHP, Perl
Other technologies and frameworks: MySQL, PostGRES, AWS DynamoDB, AWS Cognito, AWS Lambda, Django, React, D3
Other research skills: RCT design, data visualization, statistical analysis, survey studies (creation, distribution, analysis), semi-structured interviews, qualitative coding (MaxQDA)
Engineering software: AutoCAD, FlexSim (discrete event simulation), Tableau

Massachusetts Institute of Technology
Certificate in Architecture and Systems Engineering, March 2018
Description: Four course certificate covering architecture of complex systems, models in engineering, model-based systems engineering, and quantitative methods in systems engineering

The Boeing Company, Internal Training
Courses taken covering the following subjects: work measurement, negotiation, price analysis, large scale integration science, engineering acoustics, airplane certification, SAP business intelligence

Leadership and Service

Lead TA, Center for Teaching and Learning (2022-Present)
Boulder Public Library Tech Help Volunteer (2022-Present)
Earth's Table Gardening Volunteer (2022-Present)
CU Boulder DLA (Undergraduate Research) Lead Mentor (2022-2023)
CU Boulder SPUR (Undergraduate Research) Mentor (2022)
CU Boulder DLA Cluster Mentor (2022)
CU Boulder Diversity and Inclusion Mentor (2020 – 2021)
CU Boulder YOU'RE @ CU (Undergraduate Research) Mentor (2021)
CU Boulder Graduate Student Government Housing Committee Member (2020-2021)
CU Boulder McNair Scholar Mentor (2019-2020, 2022-2023)
Boeing Community Engagement Volunteer, STEM outreach and mentoring USC students (2017-2019)
Inducted into Tau Beta Pi and Cardinal Key (Iowa State's highest honor society) (2015)
Iowa State Student Body Vice President (2015)
Iowa State Student Government Director of Student Affairs (2014)
Iowa State Student Government College of Engineering Senator (2013)
Acacia Fraternity Scholarship Chair (2014)
Ambassador, College of Engineering and Industrial Engineering Department (2013-2015)
Engineers Without Borders Webmaster and Public Relations Chair (2011-2012)
Freshmen Honors Program Class Leader (2012)
2014 Curling Intramural Champion (2014)
KURE 88.5 Radio DJ and Talk Show Host (2015-2017)

LANGUAGES

English: Native Language
German and Mandarin Chinese: Novice