

JAMES RUDOLPH

Assistant Professor of Industrial Design

Industrial Design
Department of Art, Art History, and Design
College of Arts and Letters
University of Notre Dame
Notre Dame Indiana, 46556

BIOGRAPHICAL STATEMENT

Design is an inherently cross-disciplinary academic discipline and professional practice, inspired and shaped by the research and knowledge from often disparate industries and research domains. My work occurs at the intersection of advanced technological breakthroughs and pivotal healthcare challenges, utilizing research supported design principles and practices to bring important and meaningful healthcare solutions to market. My recent research focuses on innovate medical device start-ups and nascent healthcare companies, where I collaborate with a diverse set of stakeholders to integrate human-centered design practices into the fabric of their corporate culture.

Informed by an educational background in both design and human factors engineering, and guided by 15+ years of industry experience, I develop product innovation strategies to meet the unique demands of early-stage medical device companies. I work in partnership with academics, technologists, and industry practitioners alike to deliver conceptual direction, integrate human-centered development practices, and provide vision for important healthcare changes – changes that are empathetic to human needs, savvy of business constraints, and driven by the latest technological advances.

Prior to joining the faculty at Notre Dame, I led design and development programs for a wide array of healthcare and consumer electronics businesses, ranging from globally recognized Fortune 500 companies to well-funded medical device start-ups. Previous projects include: precision robotics for orthopedic surgery, laser therapy for coronary atherectomy, and focused ultrasound for non-invasive treatment of cancerous tissue.

EDUCATION

Bentley University | **Waltham, MA** 2012

MS – Masters of Human Factors in Information Design

Cumulative Grade: 3.78 Honors: Distinction

Syracuse University | **Syracuse, NY** 2006

BID – Bachelor of Industrial Design

Cumulative Grade: 3.79 Honors: VPA Scholar, Magna Cum Laude

WORK HISTORY

Founder and Principal Industrial Designer | **Rudolph Design Studio, LLC** | **2019 - Current**

Co-founder of Rudolph Design Studio, an industrial and interaction design consultancy located in St. Joseph, MI. Informed by our iterative, people-centered design process, we help our clients introduce iconic, meaningful, and impactful products to market. Our clients include fortune 500 corporations, medical device start-ups, and advanced research institutions.

Assistant Professor of Industrial Design | **University of Notre Dame** | **2019 - Current**

Responsible for curriculum and coursework development in the department of design, with particular focus on advanced design studio and digital solid modeling. My research continues to focus on design's ability to advance medical and healthcare related product development.

Program Manager | **Farm Design** | **2013 - 2019**

Responsible for proposal development, project resourcing, and managing large multi-disciplinary development projects in the medical and healthcare space. Managed a team of talented designers, and provided leadership in sales, team building, and internal initiatives.

Senior Industrial Designer | **Farm Design** | **2006 - 2013**

As Senior Designer, responsible for leading design and user experience efforts, while contributing to project management, budgeting, resource allocation, managing client relationships, and presenting client deliverables. As design researcher, responsible for managing international ethnography research efforts, including proposal development, client management, budget and scope management, internal resource allocation, data analysis, and visual communication of findings.

Adjunct Professor of Design | **MassART** | **2013 - 2014**

Created course structure for two studio classes, Human Factors Seminar and Industrial Design I, with a focus on introducing real-world design challenges to students, while maintaining the freedom to explore provocative and innovative new ideas.

Industrial Designer | RAM Design | 2005 - 2006

Responsible for identifying new product opportunities, concept development, and design refinement. Developed a series of consumer and children's products.

Design Intern | Copesetic, Inc. | Summer 2005

Used rapid prototyping techniques, including urethane molding, roto-molding, and CNC machining to create interaction and appearance models for a wide range of clients including IBM and Smart Design.

DISTINCTIONS + AWARDS

IDEA Design Award – Finalist | 2021

Design finalist in the Medical Device category for work conducted with NearWave Medical, a start-up spinning out of the University of Notre Dame focused on the development of a smart, wireless, and non-invasive handheld device designed to identify breast cancer and monitor chemotherapy effectiveness in cancer patients.

Eddies Award – Medical Device Category | 2021

Served as lead industrial designer for Dynocardia, which was recognized with an Eddies Award for Innovation by the Massachusetts Innovation Network in the New England Innovation Award competition. Dynocardia was one of 6 start-ups recognized out of 119 team entries representing 8 different innovation tracks.

Mira Techpoint Awards – Innovation of the Year | 2021

The NearWave imaging system won Innovation of the Year honors during TechPoint's 22nd annual Mira Awards gala, honoring the best of tech in Indiana. Served as lead industrial and user interface designer.

McCloskey New Venture Competition - Grand Prize | 2020

Served as Lead Industrial Designer and faculty advisor for a cross-disciplinary team working to develop a novel imaging system for evaluating breast cancer response and outcomes throughout chemotherapy. The project, including the design, engineering, and business plan, was awarded several prizes in the McCloskey New Venture Competition, including the McCloskey Grand Prize. Additional awards included the Marshall County Prize for Greatest Social Impact and the IrishAngels Award. Funding awarded totaled \$100,000.

Chancellors Award for Public Engagement and Scholarship | 2006

Syracuse University award provided for the productive collaboration between students and members of the local Syracuse, NY community to envision solutions to the existing housing challenges.

Arthur J. Pulos Award for Intellectual Communication | 2006

Award providing distinction for research and scholarship conducted during my BID senior thesis. The award recognizes individuals for the advancement of intellectual discussion regarding challenges facing design. My thesis focused on the addictive relationship between people and everyday products.

Syracuse University Visual and Performing Arts Scholar | 2006

School of Visual and Performing Arts highest honor given in recognition of cumulative personal achievement and scholarship while attending Syracuse University.

Cue Art Foundation | 2005

Distinguished as one of three finalists in a furniture competition focused on environmental solutions for a context-specific art gallery in the SoHo district of New York City.

PEER REVIEWED PUBLICATIONS

Design Agency: Reestablishing Design's Identity Through Education and Practice | 2021

Peer reviewed paper accepted by the IDSA International Design Conference 2021. Published in the IDSA Education Symposium papers: <https://www.idsa.org/educationpaper/design-agency>

Bootstrapping Leadership Through Design | 2020

Peer reviewed paper accepted by the IDSA International Design Conference 2020. Acceptance rate: 36%. Published in the IDSA Education Symposium papers: <https://www.idsa.org/educationpaper/bootstrapping-leadership-through-design>.

Redefining User Needs | 2020

Peer reviewed paper accepted by the Applied Human Factors and Ergonomics (AHFE) International Conference 2020.

Rudolph J. (2020) Redefining User Needs. In: Di Bucchianico G., Shin C., Shim S., Fukuda S., Montagna G., Carvalho C. (eds) *Advances in Industrial Design*. AHFE 2020. Advances in Intelligent Systems and Computing, vol 1202. Springer, Cham. https://doi.org/10.1007/978-3-030-51194-4_41

Contributor to: Contextual Inquiry for Medical Device Design | 2015

Privitera, Mary Beth. (2015) "Time Tracker Tool." *Contextual Inquiry for Medical Device Design*. Waltham, MA, Elsevier, 2015, pgs. 130-135.

SPEAKING ENGAGEMENTS

Design Agency: Reestablishing Design's Identity in Education and Practice | 2021

Education Symposium invited panelist. IDSA International Design Conference. September, 2021: Virtual conference due to COVID-19.

Bootstrapping Leadership Through Design | 2020

Main Stage presentation. IDSA International Design Conference. September, 2020: Seattle, WA. Virtual conference due to COVID-19.

Tower of Babel: The Conflicting Semantics of User Needs | 2020

Accepted Conversation conducted at Design Research Society 2020. August, 2020: Sydney, Au. Virtual conference due to COVID-19.

Panel Discussion: The Global Ecosystem and Design Education | 2019

Invited panelist. IDSA International Design Conference. August, 2019: Chicago, IL.

Turning Qualitative Insights into Value-Driven Business Opportunities | 2016

Presentation focused on opportunity identification for driving business decisions given at BIOMEDevice Boston 2016 Conference. Boston, MA.

Watch the Sterile Field | 2013

Presentation focused on conducting research in the operating room. Proceedings of the Boston UXPA Chapter, 12th Annual Conference. Boston, MA.

Visualizing Surgical Procedures - A Method for Exploring Surgical Time data | 2013

Poster presented at the International Symposium on Human Factors and Ergonomics in Healthcare. Baltimore, MD.

What is Industrial Design? | 2012

Invited lecturer. Distinguished speaker series: Gordon Engineering Leadership Program, Northeastern University. Boston, MA.

Conducting Research in the OR: What You Should Know | 2010

Paper presented at the National Usability Professionals Association (UPA) Conference. Atlanta, GA.

RESEARCH + GRANT ACTIVITY

Disease Detection through Skin Sensing | NIH Grant Proposal | Co-Principal Investigator

Research and development proposal for an intelligent, low-cost, and user-friendly E-nose system to identify and discriminate between disease states using volatile organic compound (VOC) biomarkers in human sweat. The primary objective is to develop a system to provide screening for kidney disease, Parkinson's, asthma, diabetes, and eight different cancers. Grant proposal total: \$4,989,432.00

Continuous Hazard Detection | DOD Grant Proposal | Co-Principal Investigator

This proposal outlines research and design activities to develop a wearable 'smartband' system focused on detecting multiple toxic gases in open air settings. The technology will be tested in a field environment to enable near real-time feedback on environmental and physiological conditions of the user. Submitted in collaboration with the Notre Dame Institute for Precision Health. Grant proposal total: \$2,996,970.00

Intelligent Mini-Olfactometer | NIH Grant Proposal | Co-Principal Investigator

Development, concept renderings, review, and submission of a large, multi-disciplinary proposal to support the research and development of an intelligent mini-olfactometer for early COVID-19 screening. Grant proposal total: \$1,173,750.00.

Saliva Screening | NIH Grant Proposal | Co-Principal Investigator

Collaborative effort with Notre Dame's Advanced Diagnostics and Therapeutics group on an NIH proposal for the development and performance evaluation of a novel COVID-19 detection system using saliva. Grant proposal total: \$2,000,051.00.

Community Health Monitoring | NIH Grant Proposal | Co-Principal Investigator

Institute for Precision Health proposal to support the development, validation and deployment of a smart electronic system for detecting RNA virus (including COVID-19) for rapid, decentralized monitoring of community health. Grant proposal total: \$5,269,450.00.

O'Sullivan Research Group | University of Notre Dame

Integration of user-centered design processes and design leadership for the development of a hand-held medical device to evaluate breast cancer risk and response to chemotherapy. Research to focus on understanding user needs and the translation of identified user needs to an appropriate user experience and industrial design.

NOTABLE DESIGN WORK

Outset Medical | 2021 - Current

Current ongoing collaboration focused on the design and development of a home hemodialysis system, enabling patients suffering from chronic kidney disease the flexibility and agency to manage their treatment and health from the privacy of their home. Primary services include: corporate design principles, conceptual architectures, design concepts and refinement, and aspirational prototype.

Dynocardia | 2021 - Current

Collaborative effort with an MIT spin-off providing design leadership and strategy for the development of ViTrack technology, the only non-invasive, direct measure of systolic and diastolic pressure, enabling independent and continuous blood pressure monitoring.

Vascular Technology | 2021

Design of an advanced and portable doppler system for vascular, neurological, urology, and gastrointestinal endoscopy applications. Primary services include: architecture concepts, workflow development, design concepts, design refinement, and visual brand language development.

NuVasive Medical | 2020 - 2021

Integration of a robust human-centered design process to support the development of a novel robot-assisted surgical system for precision spine surgery, including enhancing OR workflow, safety, and efficiency. Primary services include: workflow development, ergonomic evaluation, concept development, design refinement, and design for manufacture support.

NearWave Medical | 2019 - 2021

Ongoing collaborative partnership with NearWave, a medical device start-up spinning out of Notre Dame, to develop their advanced imaging system for early detection and monitoring of breast cancer. Our collaboration spans the entirety of the NearWave user experience, including the user interface, industrial design, and contextual renderings, which communicate NearWave's value proposition to potential investors.

Notre Dame Institute for Precision Health | 2020 - 2021

Design, development, and proposal support for a series of diagnostic systems, including an intelligent mini-olfactometer, a COVID-19 saliva screening device, and a wastewater detection system for community health monitoring. Concept envisioning, for both industrial design and user interface design, have contributed to NIH funding proposals valued at over \$10,000,000.

Concise Engineering | 2020

Collaborative multi-disciplinary design effort with engineering partners, Concise Engineering, in the development of a wearable ECG device for detecting heart conditions after a myocardial infarction. Primary services include: remote user observations, ergonomic assessment, concept development, prototypes, and design refinement.

Excelsior BioVentures | 2020

Design, ergonomic evaluation, and visual brand language development for medical device start-up, Excelsior BioVentures. Primary services include: remote user observations, ergonomic assessment,

mechanical brainstorms, concept development, design for manufacturing and assembly, project management, and design refinement.

Arthrex VET | 2019 -2020

Remote evaluation of user experience, workflow, and ergonomics of a novel orthopedic device for performing a Tibial Plateau Leveling Osteotomy (TPLO) procedure. Ergonomic evaluation to focus on applied anthropometrics, viewing angle, and overall weight distribution for user balance and control. Translation of user needs into appropriate industrial design with consideration for established Arthrex visual brand language.

Note: The following work completed while at Farm Design, a leading design consultancy focused on medical, healthcare, and life sciences.

HISTOSONICS | 2018 - 2019

Project management and design leadership focused on the development of a non-invasive, autonomous robotic platform designed to destroy cancerous tissue at a sub-cellular level.

CANON MEDICAL | 2017 - 2019

Long-term development effort focused on the advancement of a novel Optical Coherence Tomography (OCT) imaging system for the assessment of coronary and peripheral arteries.

VIRTUAL INCISION | 2016 - 2018

Managed and design directed a large multi-disciplinary team in the development of an advanced robot-assisted surgical system for abdominal procedures. Focus on: user research, UI, ID, and Mechanical Engineering.

TEVA PHARMACEUTICALS | 2014 - 2016

Combined contextual inquiry and user resonance testing to optimize development effort without sacrificing user-centered design focus. Development of novel smart inhaler device.

HAEMONETICS, INC. | 2013 - 2014

Global user research and design effort focused on redefining blood donation through apheresis. Design and user research lead tasked with reimagining the user experience through design.

X-RITE CORPORATION | 2012

Design and development of precision color matching device for fashion, interiors, graphics, and product designers. Focus on: user research, workflow evaluation, industrial design.

SYMMETRY MEDICAL | 2009

Design lead for a multi-disciplinary team tasked with the development of a safe, effective, and durable rigid sterilization container for use in rapid sterilization systems.

GSSI, Inc. | 2008 - 2009

User research and design effort focused on the development of a novel ground penetrating radar system. Focus on: user research, interaction design, IPx protection, industrial design.

DEPUY SYNTHES | 2007 - 2008

Global contextual inquiry and design strategy effort focused on identification of user needs and product opportunities for soft tissue repair in the knee and hips (ACL, PCL, MCL, Labrum).

TEACHING

Course Evaluation Feedback (CIF) Scores

Course	Semester	Enrollment	Avg. Grade	CIF Composite Score
Digital Solid Modeling SolidWorks	Fall 2019	16	3.4	4.7
ID3 Advanced Design Studio Healthcare Practice	Fall 2019	7	3.33	4.9
Digital Solid Modeling SolidWorks	Spring 2020	9	3.67	4.9
Digital Solid Modeling SolidWorks	Spring 2020	9	3.39	4.8
ID3 Advanced Design Studio Entrepreneurship	Fall 2020	13	3.46	4.7
Digital Solid Modeling (DESN 30209-11)	Fall 2020	8	3.63	4.9
Design Research Practices Convivial Research	Spring 2021	17	3.92	4.3
Digital Solid Modeling SolidWorks	Spring 2021	8	3.71	4.4
Digital Solid Modeling SolidWorks	Fall 2021	9	3.4	4.8

SPONSORED PROJECTS

Design Research Practices | Spring 2021 | Sponsor: Lippert Components, Inc.

Undergraduate design research class focused on investigating convivial methods of design research and ideation methods, harnessing the knowledge, expertise, and creativity of non-designers to identify key challenges and opportunities in the RV industry. Collaborative research effort with Lippert Components, Inc., a local manufacturer of RV related products, to develop a curriculum that would not only identify prioritized challenges in the RV space, but also deliver compelling ideas for future product development and investment initiatives. Lippert has asked that Notre Dame Design continue to partner with them on a recurring annual basis, and has agreed to a 2nd sponsored project for the spring of 2022.

Funding to date: \$30,000.00

PROFESSIONAL SOCIETY MEMBERSHIPS

Industrial Designers Society of America | Fall 2019 - Current

Leadership: Elected to the IDSA Education Council in the fall of 2021.

Design Research Society | Fall 2019 - Current

SERVICE

MFA, BFA, and BA Advising

Fall 2021

MFA Thesis Committee Chair and Advising	Peter Dore
MFA Thesis Advisor	Jason Carley
BA Thesis Advisor	Sammy Mansfield

Spring 2021

MFA Thesis Committee Chair and Advising	Peter Dore*
MFA Thesis Committee Member	Milagros Ramirez
BFA Thesis Advisor	Allie Champlin**
BA Thesis Advisor	Diane Park

Fall 2020

MFA Thesis Committee Chair and Advising	Peter Dore
MFA Thesis Committee Member	Milagros Ramirez
MFA Advising	Jason Carley
BFA Thesis Advisor	Allie Champlin
BA Thesis Advisor	Diane Park

Spring 2020

MFA Thesis Committee Member	Milagros Ramirez
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Fall 2019

MFA Thesis Committee Member	Milagros Ramirez
MFA Thesis Committee Member	Peter Dore

* Peter's thesis research and design effort to help improve the health and well-being of people suffering from addiction recently won the Marshall County EDC and City of Plymouth Prize for Greatest Social Impact at the Notre Dame McCloskey New Venture Competition, which provided \$25,000 to fund future research and development.

** Allie Champlin won the Emil Jacques Silver Medal for Excellence for her thesis work, one of the top prizes given by the Department of Art, Art History, and Design each year.

NOTRE DAME DESIGN STUDENT PORTFOLIO PORTAL | SPRING 2021

The ND Design portfolio portal provides design students a platform to showcase their latest work and capabilities to employers looking to hire designers for internships or full-time employment. This site provides a gateway for convenient student/employer access, networking, and relationship building opportunities. Site completed in the spring of 2021.

See website here: <http://portfolio.nd-art-design.com/>

IDSA EDUCATION COUNCIL | FALL 2021

Elected to the Industrial Designers Society of America (IDSA) Education Council through a vote of IDSA member peers. The Education Council serves to ensure the highest standard of industrial design education, to actively maintain a liaison among all members of IDSA, to promote and develop IDSA Student Chapters and activities, to promote Student Membership, and to consult with, and make recommendations to the Chair and the Board of Directors, concerning education policies, planning, and matters within the Society.

Additional information here: <https://www.idsa.org/educationcouncil>