

Nicolás F. Soria Zurita, Ph.D.

ENGINEER | RESEARCHER | DESIGNER | CREATOR | GLOBAL CITIZEN

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Education

Ph.D. Mechanical Engineering

June 2019

OREGON STATE UNIVERSITY

Corvallis, OR, USA

- Advisors: Dr. Irem Y. Tumer & Dr. H. Onan Demirel
- Dissertation: The Function-Human Error Design Method (FHEDM)

MS Mechanical Engineering

June 2016

OREGON STATE UNIVERSITY

Corvallis, OR, USA

- Advisor: Dr. Irem Y. Tumer
- Thesis: Design of Complex Engineered Systems Using Multiagent Coordination

Bachelor of Science in Mechanical Engineering

June 2010

UNIVERSIDAD SAN FRANCISCO DE QUITO

Quito, Ecuador

- Advisor: Dr. Laurent Sass
- Thesis: Design and Manufacturing of a Underwater Remotely Operated Vehicle (ROV) Submarino USFQ

Experience

Penn State University

State College, PA

POSTDOCTORAL SCHOLAR

August 2019 – Present

- My research focuses on investigating Human-computer hybrid teams that consolidate the strengths of both humans and computers to design complex engineered systems.
- I am responsible for designing and conducting research experiments, user interviews, questionnaires, and surveys to understand designers' decision-making and cognitive limitations.
- I support and contribute to the development of a collaborative design research platform for complex systems named HyForm.
- I conduct human studies using HyForm, where different human-computer hybrid team configurations and experiment settings were tested.
- I complete quantitative and qualitative data analysis techniques.
- I supervise and mentor undergraduate and graduate students.

Ecuador Wildlife Foundation - Fundación Vida Silvestre Ecuador

Quito, Ecuador

DESIGN ENGINEER

Dec. 2016 - Present

- Ecuador Wildlife Foundation supports and promotes projects focused on conservation and handling of wild fauna and flora and provides fundamental education on environmental and social aspects, as well as community development. I support the Ecuador Wildlife Foundation with my engineering skills. Together we have developed different projects including monitoring systems, egg incubators for Condors, and design temporary enclosures for rescued animals.

Oregon State University

Corvallis, OR

GRADUATE RESEARCH ASSISTANT

September 2014 – June 2019

- Researcher investigating new paradigms and methods for designing complex engineered systems. My research focused on understanding human-machine interactions to identified failure modes caused by such interactions during the early design phases.
- I developed a design methodology that allows engineers to determine, in a new design, what are the possible deficiencies and failure modes triggered by the user using machine learning and data mining techniques.
- I created and conducted design experiments, user surveys, and completed qualitative data analysis.
- I worked on the Machining and Product Realization Laboratory teaching students prototyping and manufacturing techniques. Supporting students and research teams in developing hands-on knowledge, designing, and fabricating parts and components needed for their projects.
- I worked as a Teaching Assistant for undergraduate courses in the product design life-cycle, including concept generation, prototyping, reverse engineering, and manufacturing.
- I managed and supervised the team of TAs for ME250: Introduction to Manufacturing Process and ME383: Mechanical Component Design courses.

Universidad San Francisco de Quito

RESEARCHER MECHANICAL ENGINEERING

Quito, Ecuador

Aug 2011 – Sept 2014

- Director of the Center of Autonomous Vehicles laboratory for Universidad San Francisco de Quito. I was responsible for managing a team of 10 undergraduate students and administered a \$20,000 grant to the development UAVs. With my team, we completed the design and construction of three robotic platforms, including the USFQ ROV Submarine, the first aquatic rover developed in the country, a land exploration rover, and the USFQ-Galapagos Unmanned Aerial Vehicle.
- Instructor for undergraduate courses in Mechanical Engineering.
- Capstone design project and thesis advisor for undergraduate students in the College of Engineering.

Schlumberger Oil Services Company

WELL SERVICES MECHANICAL ENGINEERING INTERN

Coca, Ecuador

Aug. 2009 - Nov. 2009

- During my internship, I was part of the Well Services team. The team was responsible for maintaining and enhancing the well and reservoir productivity during the drilling operations. I participated in five procedures in oilfields located in the Amazonian rainforest.
- During my training, I created and reviewed Piping, Electrical & Engineering Diagrams using different CAD software. I worked with the maintenance team towards the improvement of the component supply chain from local suppliers.
- I developed a component life cycle database to standardize the data collected from components.

Publications [Google Scholar]

Peer-Reviewed Journal Articles

1. **Nicolas F. Soria Zurita**, Binyang Song, Christopher McComb, and Jonathan Cagan (2020) "Evaluating Collaborative Design Research Platforms for Complex Engineered Systems" *Under preparation*
2. Guanglu Zhang, **Nicolas F. Soria Zurita**, Gary Stump, Binyang Song, Jonathan Cagan, and Christopher McComb, (2020) "Data on the Design and Operation of Drones by Both Individuals and Teams" *Data in Brief, 2020. Under review*
3. Binyang Song, Joshua T. Gyory, Guanglu Zhang, **Nicolas F. Soria Zurita**, Gary Stump, Jay Martin, Simon Miller, Corey Balon, Michael Yukish, Christopher McComb, and Jonathan Cagan (2020) "Decoding the Agility of Human-Artificial Intelligence Hybrid Teams in Complex Problem Solving" *PLOS ONE, 2020. Under review.*
4. **Soria Zurita, N. F.**, Song, B., Zhang, G., Stump, G., Balon, C., Miller, S. W., Yukish, M., Cagan, J. and McComb, C. (2020) "Understanding the Collaboration of Human-Computer Hybrid Teams for the Design of Complex Engineered Systems" *Under preparation*
5. **Soria Zurita, Nicolás F.**, Tensa, Melissa Anne, Ferrero, Vincenzo, Stone, Robert B., DuPont, Bryony, Demirel, H. Onan, and Tumer, Irem Y. "Identifying relationships between Functional Models and Human Error" *Under preparation*
6. **Soria Zurita, Nicolás F.**, Stone, Robert B., Demirel, H. Onan, and Tumer, Irem Y. "Validation of the system-user interactions and human error associations in the Function - Human Error Design Method (FHEDM)". *Journal of Engineering Design. Under Review*
7. **Soria Zurita, N. F.**, Stone, R. B., Onan Demirel, H., and Tumer, I. Y. (2019). "Identification of Human-System Interaction Errors During Early Design Stages Using a Functional Basis Framework." *ASME. ASME J. Risk Uncertainty Part B.* March 2020; 6(1): 011005. <https://doi.org/10.1115/1.4044787>
8. **Soria Zurita, N. F.**, Colby, M. K., Tumer, I. Y., Hoyle, C., and Tumer, K. (2017). "Design of Complex Engineered Systems Using Multi-Agent Coordination." *ASME. J. Comput. Inf. Sci. Eng.* March 2018; 18(1): 011003. <https://doi.org/10.1115/1.4038158>
9. **Soria Zurita, N. F.**, Cabrera, D. y Guerra, P. (2014) "Diseño y Construcción de un ROV (Remotely Operated Vehicule) Submarino USFQ", *ACI Avances en Ciencias e Ingenierías*, 6(1). <https://doi.org/10.18272/aci.v6i1.166>

Peer-Reviewed Conference Proceedings

1. T. Maier, **N.F. Soria Zurita**, E. Starkey, D. Spillane, J. Menold, and C. McComb (2020). "Analyzing the Characteristics of Cognitive-Assistant-Facilitated Ideation Groups." *ASME 2020 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*.
2. Song, B., **Soria Zurita, N. F.**, Zhang, G., Stump, G., Balon, C., Miller, S. W., Yukish, M., Cagan, J. and McComb, C. (2020) "Toward Hybrid Teams: A Platform To Understand Human-Computer Collaboration During the Design of Complex Engineered Systems." *Proceedings of the Design Society: DESIGN Conference*. Cambridge University Press, 1, pp. 1551–1560. <https://doi.org/10.1017/dsd.2020.68>
3. **Soria Zurita, Nicolás F.**, Tensa, Melissa Anne, Ferrero, Vincenzo, Stone, Robert B., DuPont, Bryony, Demirel, H. Onan, and Tumer, Irem Y. "An Association Rule Approach for Identifying Physical System-User Interactions and Potential Human Errors Using a Design Repository." *Proceedings of the ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 7: 31st International Conference on Design Theory and Methodology*. Anaheim, California, USA. August 18–21, 2019. V007T06A003. ASME. <https://doi.org/10.1115/DETC2019-98424>
4. Tensa, M., Edmonds, K., Ferrero, V., Mikes, A., **Soria Zurita, N.**, Stone, R. and DuPont, B. (2019) "Toward Automated Functional Modeling: An Association Rules Approach for Mining the Relationship between Product Components and Function," *Proceedings of the Design Society: International Conference on Engineering Design*. Cambridge University Press, 1(1), pp. 1713–1722. <https://doi.org/10.1017/dsi.2019.177>
5. **Soria Zurita, Nicolás F.**, Stone, Robert B., Demirel, Onan, and Tumer, Irem Y. (2018) "The Function-Human Error Design Method (FHEDM)." *Proceedings of the ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 7: 30th International Conference on Design Theory and Methodology*. Quebec City, Quebec, Canada. August 26–29, 2018. V007T06A058. ASME. <https://doi.org/10.1115/DETC2018-85327>
6. **Soria Zurita, Nicolás F.**, and Tumer, Irem Y. (2017) "A Survey: Towards Understanding Emergent Behavior in Complex Engineered Systems." *Proceedings of the ASME 2017 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 7: 29th International Conference on Design Theory and Methodology*. Cleveland, Ohio, USA. August 6–9, 2017. V007T06A015. ASME. <https://doi.org/10.1115/DETC2017-67453>
7. **Soria, Nicolás F.**, Colby, Mitchell K., Tumer, Irem Y., Hoyle, Christopher, and Tumer, Kagan. (2016) "Design of Complex Engineering Systems Using Multiagent Coordination." *Proceedings of the ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 2A: 42nd Design Automation Conference*. Charlotte, North Carolina, USA. August 21–24, 2016. V02AT03A001. ASME. <https://doi.org/10.1115/DETC2016-59570>
8. Manion, Charlie, **Soria, Nicolás F.**, Tumer, Kagan, Hoyle, Chris, and Tumer, Irem Y. (2015) "Designing a Self-Replicating Robotic Manufacturing Factory." *Proceedings of the ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. Volume 1B: 35th Computers and Information in Engineering Conference*. Boston, Massachusetts, USA. August 2–5, 2015. V01BT02A045. ASME. <https://doi.org/10.1115/DETC2015-47628>

Invited Talks and Presentations

1. **Soria Z, Nicolás F.**, *"Descubriendo y Entendiendo el Error Humano en el Diseño de Productos y Sistemas"*. MECH-Talks Engineering Webseminar, Universidad San Francisco de Quito, Corvallis OR, USA - Quito, Ecuador. April, 2020.
2. **Soria Z, Nicolás F.**, *"Discovering and Leveraging User-Product Interactions in Intelligent Engineering Systems"*. Engineering Seminar, The Pennsylvania State University. State College PA, USA. February, 2020.
3. **Soria Z, Nicolás F.**, *"An Association Rule Approach for Identifying Physical System-User Interactions and Potential Human Errors Using a Design Repository"*. Presented at International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC, DTM-14-131st IDETC/CIE2019-98424, Anaheim, CA, USA. August, 2019.
4. **Soria Z, Nicolás F.**, *"An introduction to the Function - Human Error Design Method (FHEDM)"*. University Lecture - ME611 Modern Product Design. Oregon State University (OSU) - Corvallis, USA. November, 2018.
5. **Soria Z., Nicolás F.**, *"The Function - Human Error Design Method (FHEDM)"*. Presented at International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC, DTM-13-1 Trends and Technologies Impacting the Design Process - IDETC2018-85327, Quebec City, Quebec, Canada. August, 2018.
6. **Soria Z, Nicolás F.**, representing Salman Ahmed. *"Exploring the Design Space Using a Surrogate Model Approach with Digital Human Modeling Simulations"*. Presented at International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC, CIE-10-2 Human Factors in Design and Manufacturing - IDETC2018-86323, Quebec City, Quebec, Canada. August, 2018.
7. **Soria Z, Nicolás F.**, *"A Survey: Understanding Emergent Behavior in Complex Systems"*. Presented at International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC, DTM-11-2 Design of Complex Systems II - IDETC2017-67453, Cleveland, OH. August, 2017.
8. **Soria Z, Nicolás F.**, *"Design of Complex Engineering System Using Multiagent Coordination"*. Presented at International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC, DAC-1-1 Artificial Intelligence, Computational Synthesis and Human Center Design - IDETC2016-59570, Charlotte, NC. August, 2016.
9. **Soria Z, Nicolás F.**, *"Designing a self-replicating robotic manufacturing factory"*. Presented at International Design Engineering Technical Conferences and Computers and Information in Engineering Conference IDETC, CIE-19 Systems Engineering - IDETC 2015-47628, Boston, MA. August, 2015.
10. **Soria Z, Nicolás F.**, *"Design and Construction of a ROV (Remotely Operated Vehicle) Submarine USFQ"*. Engineering Seminar presented at Universidad San Francisco de Quito (USFQ) - Quito, Ecuador. March, 2012.

Advising

Francisco Boschetti

Graduated: June 2019

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - OREGON STATE UNIVERSITY

- Honor Thesis: Reliability Analysis of a Freeze Desalination System

Marcia Elizabeth Rueda Castillo

Graduated: June 2015

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING - UNIVERSIDAD SAN FRANCISCO DE QUITO

- Thesis: SCADA System for underwater ROV-USFQ

Patricio Sebastián Carrillo Urgilés

Graduated: June 2014

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - UNIVERSIDAD SAN FRANCISCO DE QUITO

- Thesis: Design and manufacturing of the underwater ROV ORCA

María Fernanda Cruz Mirabá

Graduated: June 2013

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - UNIVERSIDAD SAN FRANCISCO DE QUITO

- Thesis: Design and manufacturing of launching mechanism for the UAV Piquero 01-Galápagos

Jaime Eduardo López Zárate

Graduated: June 2012

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - UNIVERSIDAD SAN FRANCISCO DE QUITO

- Thesis: Manufacturing process for the Piquero UAV Prototype

Felipe Sebastián Morales Vega

Graduated: June 2012

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING - UNIVERSIDAD SAN FRANCISCO DE QUITO

- Thesis: Design and manufacturing of retrieving mechanism for the UAV Piquero 01-Galápagos

Teaching

Oregon State University

Corvallis, OR

TEACHING ASSISTANT:

September 2014 – June 2019

- **ME 250: Introduction to Manufacturing Process.**
Use of measuring and layout tools, interpretation of blueprints and drawings, identification of engineering materials. Operation of machine tools, including calculation of machining parameters. Operation of gas and MIG welding equipment.
- Spring 2017, Fall 2017, Winter 2018, Spring 2018, Fall 2018, Winter 2019, Spring 2019
- **ME 382: Introduction to Design Laboratory**
Organization, planning, economics, and the use of creativity and optimization in solving mechanical design problems. Case studies and/or industrial design problems.
- Fall 2016
- **ME 383: Mechanical Component Design Laboratory**
Failure analysis and design of machine components.
- Winter 2015, Spring 2015, Fall 2015, Winter 2016, Spring 2016, Winter 2017

Universidad San Francisco de Quito

Quito, Ecuador

INSTRUCTOR OF RECORD:

August 2011 – June 2014

- **ING 0211: Technical Drawing**
Standard representation and drafting techniques, as well as rules and regulations concerning to technical drawing. Students learn how to use a computer aided drawing software (AutoCAD).
- Spring 2014
- **IME 0550: Research and Development - Capstone Design**
This course allows outstanding research-oriented students to participate in a guided project.(Spring 2013/2014)
- **INN 04000: CAD-CAM**
Tolerance analysis and application in design/manufacturing practice, principles of machine design and computational analysis of errors in machine design.
- Fall 2014
- **IME 0433: Design of Mechanisms and Vibrations**
Analysis and study of the function, classification, position, velocity, and acceleration of multi-element mechanical linkages and mechanisms. Synthesis of mechanisms for specified multiple point paths, quick return, dwell, and straight-line motion. - Spring 2012/2013
- **IME 0321: Dynamics**
The course presents basic concepts required to analyze the motion of dynamic systems. It covers the analysis of particle and rigid body motion of using different coordinate systems.
- Fall 2011
- **ICV 0310: Fluid Mechanics**
This course covers basic concepts of fluid mechanics; the motion of particles and rigid bodies when interacting with a fluid; and, calculation of friction losses in pipe systems as well as the power required to overcome them. The class also provides an introduction to aerodynamics and turbo-machinery
- Spring 2012

Professional Service

Journal Reviewer

- Journal of Engineering Design
- IEEE Transactions on Reliability
- ACI Avances en Ciencias e Ingenierías

Conference Reviewer

- International Design Engineering Technical Conferences and Computers and Information in Engineering Conference (ASME IDETC-CIE)
- Tendencias en Ingeniería Mecánica - Mechanical Engineering Trends MET2021

Honors and Awards

Awards

- **2019 Outstanding Graduate Student**
School of Mechanical, Industrial and Manufacturing Engineering Oregon State University. September, 2019.
- **Global Beavers Team Award Nomination**
I was nominated because of my contributions and engagement in the Leadership Academy supporting and enhancing diversity efforts at Oregon State University. March, 2018.

Honors

- Oregon State University School of Mechanical, Industrial and Manufacturing Engineering Fellowship (2014-2016)
- Universidad San Francisco de Quito Engineering Honors Scholarship (2004-2010)

Skills and Interests

Technical Skills

Computer Aided Design:	Inventor, AutoCAD, Catia V5, SolidWorks, Autodesk Fusion, Siemens NX
Computer Aided Engineering:	Siemens, JACK
Coding Languages:	Python, Matlab, LabVIEW
Data Analysis:	R, Python, Qualtrics
Database Management:	MySQL, PostgreSQL, PSequel
Hardware:	Prototyping, CNC equipment, Mill, Lathe, 3D printing
Press and Publication:	MS Office, OS Productivity, \LaTeX , WordPress

Soft Skills

Communication:	Public speaking, Storytelling, Writing reports and proposals, Presentation, Negotiation
Critical Thinking:	Research, Critical observation, Creativity, Problem solving, Tolerance of change and uncertainty, Adaptability
Leadership:	Mentoring, Supervising, Project management, Decision making, Conflict management
Teamwork:	Collaboration, Interpersonal skills, Networking, Diversity awareness

Language Skills

English:	Fluent, professional
Spanish:	Native, mother tongue
Italian:	Proficient, upper-intermediate

Interests

Sports:	Soccer, Basketball, Rock climbing, Surfing
Outdoors activities:	Hiking, Camping
Hobbies:	Legos, Puzzles, Board-games

Professional References

Irem Y. Tumer, Ph.D.

PROFESSOR OF MECHANICAL ENGINEERING,
Interim Vice President for Research at Oregon State University

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Christopher Carson McComb, Ph.D.

ASSISTANT PROFESSOR PENN STATE UNIVERSITY

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University Park, PA 16802

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Jonathan Cagan, Ph.D.

LADD PROFESSOR OF MECHANICAL ENGINEERING,
Associate Dean - College of Engineering Carnegie Mellon University

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Robert B Stone, Ph.D.

DIVISION DIRECTOR FOR THE CIVIL, MECHANICAL AND MANUFACTURING INNOVATION DIVISION AT THE NATIONAL SCIENCE FOUNDATION

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Alexandria, Virginia 22314

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Bryony DuPont, Ph.D.

ASSOCIATE PROFESSOR OREGON STATE UNIVERSITY,

Boeing Professor of Mechanical Engineering Design

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