Edgar A. **Bolívar-Nieto**

Assistant Professor

Department of Aerospace and Mechanical Engineering, University of Notre Dame

365 Fitzpatrick Hall of Engineering, Notre Dame, IN, 46556 USA

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Education

Ph.D. Mechanical Engineering — *Richardson, TX, USA*

The University of Texas at Dallas — *Aug. 2019*

Thesis: "*Robust Energy-Efficient Design of Series Elastic Actuators*"
Advisor: Dr. Robert D. Gregg

M.S. Mechanical Engineering — *Richardson, TX, USA*

The University of Texas at Dallas — *Dec. 2017*

Advisor: Dr. Robert D. Gregg

B.S. Mechatronics Engineering — *Bogotá, Colombia*

Universidad Nacional de Colombia — *Aug. 2011*

Advisors: Dr. Jorge Sofrony and Dr. Yaoyu Li

Professional Experience

Assistant Professor — *Notre Dame, IN, USA*

Department of Aerospace and Mechanical Engineering – University of Notre Dame — *Nov. 2021 – Present*

- Direct the Wearable Robotics Laboratory — a group of around 15 undergraduate and graduate students researching the optimization of wearable robots
- Develop externally funded research plans, mentor graduate and undergraduate students, and disseminate scientific outcomes to the community
- Develop class content, promote student participation, and evaluate corresponding learning outcomes
- Support the Aerospace and Mechanical Engineering research and teaching mission

Postdoctoral Research Fellow — *Ann Arbor, MI, USA*

Department of Robotics – University of Michigan — *Nov. 2019 – Oct. 2021*

- Led a team of graduate researchers and collaborated with experts to design and program control algorithms for the Open Source Leg
- Collaborated with experts to design human-subject experiments and obtain IRB approval leading to a public dataset of human locomotion
- Communicated the control and design of wearable robots to audiences ranging from incoming undergraduates to experts at specialized conferences
- Applied written communication and data visualization skills to review funding proposals and prepare research manuscripts

Honors & Awards

2024	**Trailblazer Award for New and Early Stage Investigators**, National Institutes of Health (NIH)	
2024	**Outstanding Associate Editor**, IEEE International Conference on Robotics and Automation (ICRA)	*Yokohama, Japan*
2018	**Academics with Diversity Education and Mentorship in Engineering (ACADEME) Fellowship**, ACADEME	*Houston, TX, USA*
2017	**Best Student Robotics Paper Award**, ASME Dynamic Systems and Control Conference	*Tysons, VA, USA*
2017	**Best Student Paper Finalist**, ASME Dynamic Systems and Control Conference	*Tysons, VA, USA*
2014	**Mechanical Engineering Department Graduate Student Scholarship**, The University of Texas at Dallas	*Richardson, TX, USA*
2009	**Member of the Cohort of Best Engineering Students**, Universidad Nacional de Colombia	*Bogotá, Colombia*

Publications

Key: ***Graduate Student Advisee***[@], *Undergraduate Student Advisee*[@@], and *Research Experience for Undergraduates (REU) Advisee*[†]

Published peer-reviewed journal articles (refereed)

1. D. Kelly, G. Henderson, **E. Bolívar-Nieto**, and P. Wensing, "Task-Space Control for Powered Knee-Ankle Prostheses," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, p. 1–1, 2026

2. T. Yu, A. Cornejo, H. Joo, Z. Wang, Y. Dai, **E. Bolívar-Nieto**, and C. Lee, "Embroidered textile sensors for real-time multiaxial force mapping in prosthetics," *Science Advances*, vol. 12, p. eaec9270, August 2026

3. H. Joo, T. Yu, Y. Dai, S. Hong, A. Cornejo, T. Long, S. Park, P. Kollbaum, **E. Bolívar-Nieto**, Y. Kim, D. Kim, and C. Lee, "Ion-Pair-Tuned Ionogels for Broad-Range Linear Pressure Sensing," *Advanced Science*, p. e24195, March 2026
4. T. Yu, ***A. González Cornejo***[@], Z. Wang, J. Lee, T. Park, *S. Ponce Duarte*[@@], S. Hong, **E. Bolívar-Nieto**, and C. Lee, "Ultrawide-Range Wearable Pressure Sensors for High-Load Prosthetic Interfaces," *ACS Nano*, vol. 20, p. 1410–1419, January 2026
5. ***M. Alizadeh Noghani***[@], *S. Green*[@@], and **E. Bolívar-Nieto**, "Whole-body optical marker and ground reaction force data of healthy humans performing non-cyclic activities," *Scientific Data*, vol. 12, p. 1971, December 2025
6. ***K. Yang***[@], M. Dickens, J. Schmiedeler, and **E. Bolívar-Nieto**, "Extending the Benefits of Parallel Elasticity Across Multiple Actuation Tasks: A Geometric and Optimization-Based Approach," *IEEE/ASME Transactions on Mechatronics*, vol. 30, p. 7855–7865, December 2025
7. ***M. Alizadeh Noghani***[@] and **E. Bolívar-Nieto**, "Predicting center of mass position in non-cyclic activities: The influence of acceleration, prediction horizon, and ground reaction forces," *Journal of Biomechanics*, vol. 191, p. 112916, October 2025
8. ***M. Alizadeh Noghani***[@], *J. Peng*[†], and **E. Bolívar-Nieto**, "Center of mass estimation during non-cyclic activities: Comparison of marker-based methods and their fusion with ground reaction forces," *Journal of Biomechanics*, vol. 186, p. 112713, June 2025
9. E. Reznick, K. Embry, R. Neuman, **E. Bolívar-Nieto**, N. Fey, and R. Gregg, "Lower-limb kinematics and kinetics during continuously varying human locomotion," *Scientific Data*, vol. 8, p. 282, December 2021
10. **E. Bolívar-Nieto**, T. Summers, R. Gregg, and S. Rezazadeh, "A convex optimization framework for robust-feasible series elastic actuators," *Mechatronics*, vol. 79, p. 102635, November 2021
11. S. Cheng, **E. Bolívar-Nieto**, and R. Gregg, "Real-Time Activity Recognition With Instantaneous Characteristic Features of Thigh Kinematics," *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, vol. 29, p. 1827–1837, August 2021
12. S. Kumar, M. Zwall, **E. Bolívar-Nieto**, R. Gregg, and N. Gans, "Extremum Seeking Control for Stiffness Auto-Tuning of a Quasi-Passive Ankle Exoskeleton," *IEEE Robotics and Automation Letters*, p. 1–1, June 2020
13. **E. Bolívar Nieto**, S. Rezazadeh, and R. Gregg, "Minimizing Energy Consumption and Peak Power of Series Elastic Actuators: A Convex Optimization Framework for Elastic Element Design," *IEEE/ASME Transactions on Mechatronics*, vol. 24, p. 1334–1345, June 2019
14. D. Allen, **E. Bolívar**, S. Farmer, W. Voit, and R. Gregg, "Mechanical Simplification of Variable-Stiffness Actuators Using Dielectric Elastomer Transducers," *Actuators*, vol. 8, p. 44, May 2019

Published peer-reviewed conference proceedings (refereed)

1. ***M. Alizadeh Noghani***[@] and **E. Bolívar-Nieto**, "Prediction of Whole-Body Center of Mass Using Joint Angles and Ground Reaction Forces: A Framework for Human Intent Prediction," *2024 10th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)*, 2024
2. S. Guo, R. Gregg, and **E. Bolívar-Nieto**, "Convex Optimization for Spring Design of Parallel Elastic Actuators," *2022 American Control Conference (ACC)*, 2022
3. R. Cortino, **E. Bolívar-Nieto**, T. Best, and R. Gregg, "Stair Ascent Phase-Variable Control of a Powered Knee-Ankle Prosthesis," *2022 International Conference on Robotics and Automation (ICRA)*, 2022
4. **E. Bolívar-Nieto**, G. Thomas, E. Rouse, and R. Gregg, "Convex Optimization for Spring Design in Series Elastic Actuators: From Theory to Practice," *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021
5. D. Raz, **E. Bolívar-Nieto**, N. Ozay, and R. Gregg, "Toward Phase-Variable Control of Sit-to-Stand Motion with a Powered Knee-Ankle Prosthesis," *2021 IEEE Conference on Control Technology and Applications (CCTA)*, 2021
6. **E. Bolívar**, S. Rezazadeh, T. Summers, and R. Gregg, "Robust Optimal Design of Energy Efficient Series Elastic Actuators: Application to a Powered Prosthetic Ankle," *2019 IEEE 16th International Conference on Rehabilitation Robotics (ICORR)*, 2019
7. **E. Bolívar**, S. Rezazadeh, and R. Gregg, "A General Framework for Minimizing Energy Consumption of Series Elastic Actuators With Regeneration," *Dynamic Systems and Control Conference*, 2017, **Best Student Robotics Paper Award**
8. **E. Bolivar**, D. Allen, G. Ellson, J. Cossio, W. Voit, and R. Gregg, "Towards a series elastic actuator with electrically modulated stiffness for Powered Ankle-Foot Orthoses," *2016 IEEE International Conference on Automation Science and Engineering (CASE)*, 2016

Published conference abstracts and posters (non-refereed)

1. ***M. Lee***[@] and **E. Bolívar-Nieto**, "Reducing Knee Torque during Sit-to-Stand Transitions through Parallel Elasticity: A Passive Exoskeleton Approach," in *Midwest Robotics Workshop*, Chicago, IL, USA, 2026, **Third Place, Best Poster Award**
2. ***S. Joglekar***[@], M. Merritt, and **E. Bolívar-Nieto**, "Functional Biomechanics Framework for Return-to-Sport Assessment After Anterior Cruciate Ligament (ACL) Reconstruction," in *International Conference on Movement Science and Technology*, West Lafayette, IN, USA, 2026
3. ***M. Lee***[@] and **E. Bolívar-Nieto**, "Benefits of Nonlinear Parallel Elasticity to Reduce RMS Knee Torque during Sit-to-Stand Activity," in *19th IEEE/RAS-EMBS International Conference on Rehabilitation Robotics*, Chicago, IL, USA, 2025

4. ***A. González Cornejo***[@] and **E. Bolívar-Nieto**, "Towards Physical-Interface Pressure Monitoring Outside the Laboratory: Merging Pressure and Force Information," in *19th IEEE/RAS-EMBS International Conference on Rehabilitation Robotics*, Chicago, IL, USA, 2025
5. ***M. Alizadeh Noghani***[@] and **E. Bolívar-Nieto**, "A Framework for Prediction of Center of Mass Trajectory," in *Dynamic Walking Conference*, Pensacola, FL, USA, 2024
6. *J. Kalicak*[@@], ***K. Yang***[@], and **E. Bolívar-Nieto**, "Potential for Lighter Lower-Limb Exoskeletons through Parallel Springs," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Detroit, MI, USA, 2023
7. **E. Bolívar**, S. Rezazadeh, and R. Gregg, "How Much Energy Can Really Be Saved Using Series Elastic Actuators?," in *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancouver, BC, Canada, 2017

Patents

1. R. D. Gregg, D. P. Allen, **E. Bolívar**, and W. Voit, "Variable stiffness actuator with electrically modulated stiffness," U.S. Utility Patent, Patent Number: 10,870,202. Issued: 12/22/2020.

Press Articles

1. "Light-Sensitive Textile Aids Prosthetic Limb Fit, Comfort," Industry Review, *The O&P EDGE*, Oct. 2026.
2. M. Parker, "An Embroidered Sensor for Prosthetic Monitoring," Research Highlight, *Nature Electronics*, vol. 9, no. 9, p. 975, 2026.

Research Proposals

Awarded & Active (External) – total: $1.26M, total as PI: $1.26M, portion to Bolívar-Nieto: $729k

NSF - Disability & Rehabilitation Engineering Program - Collaborative Research *USA*

Integrating Optimal Function and Compliant Mechanisms for Ubiquitous Lower-Limb Powered Prostheses

- PI Edgar Bolívar-Nieto (ND) and Co-PI Larry Howell (BYU)
- **Total amount**: $639k ($357k ND side). **Award numbers**: 2344765 and 2344766
- **Start date**: 09/01/2024. **End date**: 08/31/2027

NIH R21 - National Institute of Biomedical Imaging and Bioengineering *USA*

Towards Physical-Interface Pressure Monitoring Outside the Laboratory with Lower-Limb Electronic Clothing and Robust Optimization

- PI Edgar Bolívar-Nieto (ND) and Co-PI Chi Hwan Lee (Purdue University)
- **Total amount**: $621k ($372k ND side). **Project number**: 1R21EB034879-01A1
- **Start date**: 03/07/2024. **End date**: 03/06/2027

NSF - Regional Innovation Engines [24-565] *USA*

Indiana Musculoskeletal Innovation Engine

- PI Melissa Kacena (Indiana University), Co-PI Ryan Roeder (ND), Collaborator Edgar Bolívar-Nieto (ND), et al.

Awarded (Internal) – total: $254.7k, total as PI: $157.1k, portion to Bolívar-Nieto: $173.9k

Beacon Health System/Notre Dame Research Project *USA*

Adapting Prosthetic Socket Fit to Locomotion Needs: Fluid-Based Physical Interfaces that Harness Prosthesis Data

- PI Edgar Bolívar-Nieto (ND), Co-PI Margaret McGuinness (ND), and Co-PI Christopher Ketcham (Beacon Health System)
- **Total amount**: $55k ($23k to Bolívar-Nieto)
- **Start date**: 05/01/2027. **End date**: 04/30/2028

University of Notre Dame – São Paulo State University (UNESP) Travel Grant *USA*

Transition-Aware Adaptive Control for Assistive Lower-Limb Exoskeletons in Neurological Rehabilitation

- PI Edgar Bolívar-Nieto (ND) and PI Felix Escalante (UNESP)
- **Total amount**: $2.5k ($2.5k to Bolívar-Nieto)
- **Start date**: upon fund establishment. **End date**: 07/30/2028

University of Notre Dame – Human Performance & Wellness Research Grant *USA*

Towards Functional Return-to-Sport Assessment after Anterior-Cruciate-Ligament Reconstruction: A Wearable Framework to Estimate Muscle Strength

- PI Edgar Bolívar-Nieto (ND) and Co-PI Mandy Merritt (ND)
- **Total amount**: $99.6k ($99.6k to Bolívar-Nieto)
- **Start date**: 08/01/2025. **End date**: 08/01/2027

Awarded & Completed

Naughton Fellowship (Internal) *USA*

Effects of Subconcussive Head Impacts on Dynamic Balance Performance

- PI James Schmiedeler (ND), Co-PI Edgar Bolívar-Nieto (ND), and Co-PI Brian Caulfield (UCD)
- **Total amount**: $97.6k ($48.8k to Bolívar-Nieto)
- **Start date**: 08/01/2022. **End date**: 07/31/2024

COLCIENCIAS - Ph.D. Fellowship *Colombia*

COLCIENCIAS - Administrative Department of Science, Technology, and Innovation

- PI Edgar Bolívar-Nieto
- **Start date**: 01/01/2015. **End date**: 12/31/2018

Young Researcher and Innovator *Colombia*

COLCIENCIAS - Administrative Department of Science, Technology, and Innovation

- PI Edgar Bolívar-Nieto
- **Total amount**: $9.7k
- **Start date**: 01/01/2010. **End date**: 12/31/2010

Teaching Experience

AME 40652/60652 – Intermediate Controls *Notre Dame, IN, USA*

University of Notre Dame. **Instructor.** *Spring 2022, 2023, 2024, 2026*

AME 60553 – Wearable Robotics *Notre Dame, IN, USA*

University of Notre Dame. **Instructor.** *Fall 2023, Spring 2025, Fall 2026*

AME 20222 – Mechanics II *Notre Dame, IN, USA*

University of Notre Dame. **Instructor.** *Fall 2024, Fall 2025*

Modeling and Control of Dynamic Systems *South Bend, IN, USA*

University of Notre Dame – Notre Dame Global. **Instructor.** *Summer 2024*

Summer Class – Control and Optimal Design of Wearable Robots *Bogotá, Colombia*

Universidad de los Andes. **Instructor.** Link to course website *Summer 2020*

ECE 7354 – Biomechatronics *Dallas, TX, USA*

Southern Methodist University. **Invited Lecturer.** "Powering Robotic Prosthetic Legs with Quasi-Direct Drives and Series Springs" *Spring 2020*

EE 7360 – Analog and Digital Control Systems *Dallas, TX, USA*

Southern Methodist University. **Invited Lecturer.** "Sneak Peek at Optimal Control" *Fall 2017*

MECH 6314 – Engineering Systems Modeling and Simulation *Richardson, TX, USA*

The University of Texas at Dallas. **Teaching Assistant.** *Spring 2017, Spring 2016*

Undergraduate Robotics *Bogotá, Colombia*

Universidad Nacional de Colombia. **Teaching Assistant.** *Spring 2010*

Teaching Training

Notre Dame Inclusive Teaching Academy (NDITA) *Chicago, IL, USA*

University of Notre Dame – Kaneb Center for Teaching Excellence *Summer 2024*

Advising and Mentoring

Doctoral Students

2025 **Suhrud Joglekar**, Aerospace and Mechanical Engineering, University of Notre Dame (2nd Year, Post-QE)
2024 **Minho Lee**, Aerospace and Mechanical Engineering, University of Notre Dame (3rd Year, Post-QE)
2024 **Axel Gonzalez Cornejo**, Aerospace and Mechanical Engineering, University of Notre Dame (3rd Year, Post-QE)
2022 **Mohsen Alizadeh Noghani**, Aerospace and Mechanical Engineering, University of Notre Dame (5th Year, Post-QE)
2020 **Kevin Best**, Ph.D. Student, Robotics, University of Michigan. *Not the main advisor.*
2020 **Ross Cortino**, Ph.D. Student, Robotics, University of Michigan. *Not the main advisor.*
2020 **Shihao Chen**, Ph.D. Student, Robotics, University of Michigan. *Not the main advisor.*
2020 **Daphna Raz**, Ph.D. Student, Robotics, University of Michigan. *Not the main advisor.*

M.S. Students

2021 **Steven Guo**, Mechanical Engineering, University of Michigan. *Not the main advisor.*
2020 **Shelly Nathalya Patino-Gutierrez**, Mechatronics, Universidad Nacional de Colombia. *Not the main advisor.*
2020 **Camilo Guillen-Aguirre**, Electrical Engineering, Universidad de los Andes. *Not the main advisor.*
2019 **Eric Mooers**, Electrical and Computer Engineering, University of Michigan. *Not the main advisor.*
2019 **Owen Winship**, Electrical and Computer Engineering, University of Michigan. *Not the main advisor.*
2018 **Vikram Louis Michael**, Mechanical Engineering, UT Dallas. *Not the main advisor.*

Undergraduate Students

2025 **Sebastian Green**, Mechanical Engineering, University of Notre Dame
2025 **Hannah Huggans**, SROP, Mechanical Engineering, University of Texas at Arlington
2025 **Eleanor Stevens**, NSF-REU, Mechanical Engineering, University of Utah
2025 **Renata Consuelo Ojeda Galaz**, The Bridge Exchange Program, Biomedical Engineering, Universidad Católica de Chile
2024 **Patrick Schwartz**, Mechanical Engineering, University of Notre Dame, **NSF GRFP Recipient**, Ph.D. Student at Johns Hopkins University
2024 **Kelley Rood**, Mechanical Engineering, University of Notre Dame
2024 **Samantha Ismail**, Mechanical Engineering, University of Notre Dame
2024 **Jingshu Peng**, E-SURE, Tsinghua University
2024 **Juan Cruz**, SROP, University of Puerto Rico Mayagüez
2023 **Hugh Rosshirt**, Mechanical Engineering, University of Notre Dame
2023 **Michael Yang**, Computer Science, University of Notre Dame
2023 **Bella Zapata**, Mechanical Engineering, University of Notre Dame
2023 **Elizabeth Link**, Computer Science, University of Notre Dame
2023 **Darragh McAndrew**, Naughton Fellow (Summer Program), Biomedical Engineering, University of Galway
2023 **Karen Valeria Villanueva Novelo**, Fulbright iSURE Program, Robotics Engineering, Polytechnic University of Yucatan
2023 **Yuliana Alejandra Molina Cortes**, Fulbright iSURE Program, Robotics Engineering, Polytechnic University of Yucatan
2022 **Maria Schudt**, Physics & Mechanical Engineering, Saint Mary's College & University of Notre Dame
2022 **Alexie Armour**, Science Pre-Professional Studies, University of Notre Dame
2022 **Sbeydi Ponce Duarte**, Mechanical Engineering, University of Notre Dame
2022 **Nolan Murphy**, Mechanical Engineering, University of Notre Dame
2022 **Drew Stichter**, Mechanical Engineering, University of Notre Dame
2021 **Tanner Morreale**, Electrical Engineering, University of Notre Dame
2021 **Jack Kalicak**, Mechanical Engineering, University of Notre Dame, **NSF GRFP Recipient**, Ph.D. Student at Rice University
2018 **Abhishek Chakladar**, Computer Science, UT Dallas. *Not the main advisor.*
2016 **Vinnicius Rocha de Lima**, Mechanical Engineering, Universidade Federal de Pernambuco. *Not the main advisor.*
2016 **Alexandre Leboucher**, Mechanical Engineering, McGill University. *Not the main advisor.*
2015 **Jorge Cossio**, Bioengineering, UT Dallas. *Not the main advisor.*

Undergraduate Senior Design Team

2018 **Real-Time Optimization on an Exoskeleton Using Variable Stiffness Actuators,** Senior Design, UT Dallas

Professional Service

Member of the Faculty Search Committee

Aerospace and Mechanical Engineering – University of Notre Dame *2026*

Role: Review applications for two positions: Tenure-Track Faculty Position (Open Rank) – Robotics and Tenure-Track Faculty Position (Open Rank) – All Areas. Pre-select applicants through virtual meetings. Coordinate on-campus interviews.

Associate Editor

IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE) *2024 – Present*

Provide acceptance and rejection recommendations based on peer review (about 3 manuscripts per month). Journal impact factor: 6.6 (2025 JCR). Rank by Journal Impact Factor: 3/175 (Q1) Rehabilitation & 25/130 (Q1) Engineering, Biomedical.

Member of the Editorial Board

Scientific Data – Nature *2023 – Present*

Provide acceptance and rejection recommendations based on comments from reviewers (about 2 manuscripts per month). Organized a 2025 collection on "Datasets for Gait Analysis". Journal impact factor: 6.9 (2024 JCR). Rank by Journal Impact Factor: 15/135 (Q1) Multidisciplinary Sciences.

Associate Editor

IEEE International Conference on Robotics and Automation (ICRA) *2022 – 2025*

Provided acceptance and rejection recommendations based on comments from reviewers (about 8 manuscripts per conference).

Associate Editor

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2022 – 2025*

Provided acceptance and rejection recommendations based on comments from reviewers (about 8 manuscripts per conference).

Volunteer Co-Chair

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2023*

Role: Coordinated 101 volunteers to assist at this five-day flagship conference with over 4,000 participants.

Session Chair and Co-Chair

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) *2023*

Chair of keynote session: Mario Santillo; Co-Chair of regular session: Actuator and Joint Mechanisms

Member of the Review Panel

National Science Foundation (NSF) *2022, 2023*

Provided detailed reviews of 2–5 proposals. Participated in a panel with 10 proposals to guide funding recommendations.

Member of the Review Panel *Virtual*

Clinical and Translational Sciences Institute (CTSI) *2021*

Reviewed one research proposal and participated in a panel discussion

Affiliated Faculty Member

Notre Dame – Institute for Latino Studies (ILS) *2023 – Present*

Attend community-building events and advise ILS students.

Panelist

Future Faculty Workshop *2023, 2025*

How to Write Research and Teaching Statements, The Life of a Faculty Member

Support Group Coordinator

Northern Indiana Amputee Support Group *2023*

Role: Organized monthly events to maintain a relationship with the community around limb loss

Grading Coordinator

St. Joseph Valley Regional MATHCOUNTS Competition *2023 – 2026*

Coordinate and advise grading volunteers

Invited Speaker – NxtGen STEM Scholars Program

Michigan Louis Stokes Alliance for Minority Participation *2021*

Presented on and promoted STEM education to first-year undergraduates

Member, International Program Committee

5th IEEE Colombian Conference on Automatic Control *2021*

Invited and monitored reviewers

Recruitment

University of Texas at Dallas – University of Michigan *2015 – 2021*

Assisted in the recruitment of students and staff for the Locomotor Control Systems Laboratory

Manuscript Reviewer

Service primarily dedicated to the following journals and conferences: *2014 – Present*

- IEEE/ASME Transactions on Mechatronics (TMECH)
- IEEE Transactions on Neural Systems and Rehabilitation Engineering (TNSRE)
- IEEE Transactions on Biomedical Engineering (TBME)
- IEEE Transactions on Robotics (T-RO)
- IEEE Robotics and Automation Letters (RA-L)
- International Journal of Robotics Research (IJRR)
- Scientific Data
- IEEE Access
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robotics and Automation (ICRA)
- American Control Conference (ACC)
- ASME Dynamic Systems and Control Conference (DSCC)
- International Conference on Rehabilitation Robotics (ICORR)
- IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob)

Exhibitor – Explore Engineering Day *Richardson, TX, USA*

University of Texas at Dallas *2019*

Introduced research in wearable robotics to the Richardson community, especially K-12 students and their families, at the Explore Engineering Day, part of the Jonsson School National Engineers Week

Invited Talks

Academic Institutions

- **Convexity and Compliance for Better Design, Control, and Estimation of Your Wearable Robot**
  Bioengineering Seminar, University of Notre Dame, Notre Dame, IN, USA. Oct. 7, 2026
- **Convexity and Compliance for Better Design, Control, and Estimation of Your Wearable Robot**
  Midwest Robotics Workshop, Toyota Technological Institute at Chicago, Chicago, IL, USA. Jun. 11, 2026
- **Extending the Benefits of Parallel Elasticity across Multiple Actuation Tasks: A Geometric Approach through Convex Optimization**
  The German Aerospace Center (DLR), Oberpfaffenhofen, Germany. Sep. 6, 2024
- **Optimal Design of Parallel Elastic Actuators: Design Fixed-Stiffness Parallel Springs that Guarantee Benefits for Multiple Tasks**
  The AI Institute, Cambridge, MA, USA (Virtual Seminar). 2024
- **Convex and Robust Optimization in the Context of Wearable Robotics**
  Robotics Seminar Series, Purdue University, West Lafayette, IN, USA. 2023

Workshops

- **Elasticity and Convex Optimization to Promote In-Space Musculoskeletal Health**
  In-Space Physical AI Workshop, RICE Nexus (Purdue University, Rice University, Vanderbilt University, and NASA), Houston, TX, USA. 2026
- **Parallel Compliance to Reduce Motor Torque: Extending the Benefits Across Multiple Tasks**
  No More Slow Flexible Robots (Conference Workshop), IROS 2023, Detroit, MI, USA. 2023

Local Organizations

- **Society of Latino Engineers and Scientists (SOLES)**
  Notre Dame, IN, USA. Oct. 14, 2024
- **Migrant Education STEM Summer Camp**
  Clay International Academy, South Bend, IN, USA. Jul. 10, 2024
- **Baseball Pitching Biomechanics**
  TRIO Talent Search Summer Academy, South Bend, IN, USA. 2022

- **Breaking Down Mobility Barriers with Wearable Robots**
  Institute for Latino Studies, Notre Dame, IN, USA. 2022
- **Baseball Pitching Biomechanics**
  DoD Starbase, Department of Defense Youth Programs, South Bend, IN, USA. 2022
- **Wearable Robotics – Research and Development**
  SEAT program – Women's Enterprise Skills Training. Virtual. Windsor, Canada. 2021
- **Design and Control of Robotic Prostheses**
  Universidad de los Andes. Webinar. Bogotá, Colombia. 2020
- **Powering Robotic Prosthetic Legs with Quasi-Direct Drives and Series Springs**
  WeaRAcon 2020. Virtual. Phoenix, AZ, USA. 2020
- **Caveats and Clinical Outcomes when Powering Robotic Prosthetic Legs with Quasi-Direct Drives and Series Elasticity**
  Michigan Postdoc Association, College of Engineering. Virtual. Ann Arbor, MI, USA. 2020
- **Towards Unified Control of Prosthetic Legs with a Human-Inspired Phase Variable**
  IEEE CASE 2016 Workshop on Automation for Assistive Healthcare (substituting for Dr. Robert D. Gregg). Fort Worth, TX, USA. 2016

Industry Experience

Optimal Control Engineering Intern — *Pittsburgh, PA, USA*

HEBI Robotics – Supervisor: Dr. David Rollinson — *May 2019 – Aug. 2019*

- Designed a Kalman filter for velocity estimation of encoder-free brushless DC motors
- Developed a minimum-time optimal trajectory generator
- Implemented gain-free force control

Co-Founder – TECKO: Tecnología en Construcción — *Bogotá, Colombia*

Startup in construction and architectural design with a focus on domotics — *Aug. 2013 – Aug. 2014*

- Co-founded the startup with three partners
- Developed and purchased domotic accessories
- Created and presented business plans
- Secured seed funding

Automation Consultant — *Bogotá, Colombia*

Dersa — *Jan. 2012 – May 2012*

- Implemented SCADA systems for industrial automation
- Programmed Siemens S7-300 PLCs
- Programmed motion control of AC motors

Training and Certifications

2018	**ACADEME Fellow,** NSF-sponsored two-week workshop: Teaching and Research Skills for Academic Careers	*Houston, TX, USA*
2015	**Responsible Conduct of Research,** The University of Texas at Dallas	*Richardson, TX, USA*
2015	**Certified LabVIEW Associate Developer,** National Instruments	*Richardson, TX, USA*

Languages

- **English,** fluent. 12+ years living in the USA. TOEFL: 108/120
- **Spanish,** native language