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| CONTACT INFORMATION | EPFL STI IMT LASA, Station 9 ME A3 464 1015 Lausanne, Switzerland | Cell: +1(608) 444-2779 E-mail: jameshermus@gmail.com Website: jameshermus.github.io |
| RESEARCH INTERESTS | Physical interaction, kinematic redundancy, and system identification of mechanical impedance. | |
| EDUCATION | Massachusetts Institute of Technology , Cambridge, Massachusetts Ph.D., Mechanical Engineering • Fellowship in Graduate Coaching • Kaufman Teaching Certificate Program • Course work: Controls, dynamics, system ID, machine learning, robotic manipulation September 2022 Massachusetts Institute of Technology , Cambridge, Massachusetts S.M., Mechanical Engineering June 2018 University of Wisconsin-Madison , Madison, Wisconsin B.S., Biomedical Engineering May 2016 • Honors in Research Degree Program • Biology in Engineering Certificate | |
| RESEARCH EXPERIENCE | Postdoctoral Researcher February 2023 - Present The Learning Algorithms and Systems (LASA) Laboratory École Polytechnique Fédérale de Lausanne (EPFL) Lab Director: Aude Billard, Ph.D. Research Topics: Robotics Control during Physical Interaction Postdoctoral Researcher September 2022 - January 2023 The Eric P. and Evelyn E. Newman Laboratory for Biomechanics and Human Rehabilitation Massachusetts Institute of Technology Lab Director: Neville Hogan, Ph.D. Research Topics: Motor Neuroscience, Physical Interaction, Kinematically Redundant Robotics Graduate Research Assistant October 2016 - September 2022 The Eric P. and Evelyn E. Newman Laboratory for Biomechanics and Human Rehabilitation Massachusetts Institute of Technology Lab Director: Neville Hogan, Ph.D. Research Topics: Motor Neuroscience, Physical Interaction, Kinematically Redundant Robotics Undergraduate Research Assistant May 2015 - August 2016 Neuromuscular Biomechanics Lab, University of Wisconsin-Madison Lab Director: Darryl Thelen, Ph.D. Research Topics: Biomechanics, Tendon Stress Estimation, Mechanical Design, MRI Imaging Undergraduate Research Assistant May 2013-May 2015 Department of Medical Physics, University of Wisconsin-Madison Lab Director: Charles Mistretta, Ph.D. Research Topics: Computed Tomography, Digital Subtraction Angiography, Beam Attenuators | |
| TEACHING EXPERIENCE | Lecturer (50% time) Fall Term 2022 Course 2.151: Advances System Dynamics and Control Rating: 6.5/7 Massachusetts Institute of Technology Kaufman Teaching Certificate Program Fall Term 2022 During the completion of the KTCP course offered by the Teaching + Learning Lab at MIT, we | |

covered several important topics including course design, teaching for belonging, outlining a unit of a course, engaging students and facilitating learning, planning for learning, microteaching, feedback and learning, and syllabus construction.

TECHNICAL SKILLS

Programming: Matlab, Python, LabVIEW, Java, Arduino, C++, UNIX shell scripting
Applications: DRAKE, GitHub, Solidworks, ROS, SPSS, Geomagic, Mimics, Meshlab, L^AT_EX, Adobe Illustrator, Imagej, Kurzweil, Microsoft Office
Mechanical: 3D printing (Stratasys - Dimensional Elite, Zortrax - M200, MarkForged, Sindoh - 3DWOX DP200), lathe, mill, MIG/TIG/SMAW/gas welder, laser cutter, CNC router, drill press, table saw, band saw

AWARDS

Institute of Electrical and Electronics Engineers (IEEE)
Travel grant for IROS to Workshop - Member Support Program **2023**
Massachusetts Institute of Technology
de Florez Graduate Science Competition - 2nd Place **2022**
SNAME Travel Award in Ocean Engineering by MIT MechE **2022**
Mechanical Engineering Research Exhibition - 1st Place **2021**
Mechanical Engineering Research Exhibition - Honorable Mention **2019**
Mechanical Engineering Research Exhibition - Runner up **2018**
Harrington Fellowship **2016**
2.120 - Introduction to robotics competition **2016**
Most valuable engineering
Best Navigation
Collier Adventure Grant **2018**
University of Wisconsin-Madison
Steuber Prize for Excellence in First-Year Writing **2013**
Hilldale Undergraduate/Faculty Research Fellowship **2014**
University Book Store Academic Excellence Award **2014**
Fred W. & Josephine Colbeck Scholarship **2014, 2015**
Wisconsin Experience Accessibility Scholarship **2015**
Dallas R. Lamont Scholarship **2013, 2014, 2015**
Dean's List **2012-15**
Boy Scouts Of America - Eagle Scout **2010**

INTELLECTUAL PROPERTY

Meghan Huber, **James Hermus**, Gabrielle Enns, and Neville Hogan (2020). Variable Compression Body Anchor. Patent Number US 11,690,776 B2. Date of Patent July 4, 2023.

PEER REVIEWED PUBLICATIONS

Federico Tessari, **James Hermus**, Rika Sugimoto-Dimitrova, and Neville Hogan. Brownian processes in human motor control support descending neural velocity commands. *Scientific Reports* – *Nature* **14(8341)** 2024 [Link]
Chenguang Zhang, Federico Tessari, **James Hermus**, Himanshu Akolkar, Neville Hogan, Andrew B. Schwartz. Tuning of Task-Relevant Stiffness in Multiple Directions. *Science Robotics* 2023 (Submitted)
James Hermus, Joeseeph Doeringer, Dagmar Sternad, and Neville Hogan. Dynamic Primitives in Constrained Action: Systematic Changes in the Zero-Force Trajectory. *Journal of Neurophysiology* **131(1)** 2024 [Link]
A. Michael West Jr., **James Hermus**, Meghan Huber, Pauline Maurice, Dagmar Sternad, and Neville Hogan. Dynamic Primitives Limit Human Force Regulation during Motion. *IEEE Robotics and Automation Letters* **7(2)** 2022 [Link]
James Hermus, Johannes Lachner, David Verdi, and Neville Hogan. Exploiting Redundancy to Facilitate Physical Interaction. *IEEE Transactions on Robotics* **38(1)** 2021 [Link]
James Hermus, Joeseeph Doeringer, Dagmar Sternad, and Neville Hogan. Separating Neural Influences from Peripheral Mechanics: The Speed-Curvature Relation in Mechanically-Constrained Actions. *Journal of Neurophysiology* **123(5)** 2020 [Link]

- PEER REVIEWED PUBLICATIONS (CONTINUED) Jack A. Martin, Scott C.E. Brandon, Emily M. Keuler, **James R. Hermus**, Alexander C. Ehlers, Daniel J. Segalman, Matthew S. Allen, and Darryl G. Thelen. Gauging Force by Tapping Tendons. *Nature Communications* **9(1)** 2018 [\[Link\]](#)
- James Hermus** and Timothy P. Szczykutowicz. 2D-Dynamic Fluid Bowtie Attenuators. *Journal of Medical Imaging (JMI)* **3(1)** 2016 [\[Link\]](#)
- Timothy P. Szczykutowicz, **James Hermus**, Mark Geurts, and Jeniffer Smilowitz. Realization of fluence field modulated CT on a clinical TomoTherapy megavoltage CT system. *Physics in Medicine and Biology* **60(18)** 2015 [\[Link\]](#)
- Timothy P. Szczykutowicz and **James Hermus**. Creation of an atlas of filter positions for fluence field modulated CT. *Medical Physics* **42(4)** 2015 [\[Link\]](#)
- CONFERENCE PUBLICATIONS **James Hermus**, Dagmar Sternad, Neville Hogan. (2020, November). Evidence for Dynamic Primitives in a Constrained Motion Task. *8th IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob)*, New York, NY. [\[Link\]](#)
- Timothy P. Szczykutowicz, **James Hermus**, Mark Geurts, and Jeniffer Smilowitz. (2015, June). Intensity Modulated Imaging?: Clinical Workflow for Fluence Field Modulated CT On a TomoTherapy System. Presented at the *2015 Annual Medical Physics meeting of the American association of physicists in medicine Summer Meeting*. TH-EF-BRB-6 [\[Link\]](#)
- Timothy P. Szczykutowicz and **James Hermus**. (2015, March). Fluence field modulated CT on a clinical TomoTherapy Radiation Therapy Machine. Oral presentation at the *2015 Annual SPIE Medical Imaging Conference*, Proc. 9412, Orlando, FL. [\[Link\]](#)
- James Hermus**, Charles A. Mistretta and Timothy P. Szczykutowicz. (2015, March). Scatter correction of vessel dropout behind highly attenuating structures in 4D-DSA. Poster presentation at the *2015 Annual SPIE Medical Imaging Conference*, Proc. 9412, Orlando, FL. [\[Link\]](#)
- Timothy P. Szczykutowicz and **James Hermus**. Fluid dynamic bowtie attenuators. (2015, March). Oral presentation (**I presented the talk**) at the *2015 Annual SPIE Medical Imaging Conference*, Proc. 9412-31, Orlando, FL. [\[Link\]](#)
- James Hermus**, Cameron Hays, Michal Adamski, Hannah Lider, Jenny Westlund, Austin Scholp, John Webster and Bjoern Buehring. (2015, May). Posture Monitor for Vibration Exercise Training. Oral presentation at the *2015 IEEE Great Lakes Biomedical Conference*, Milwaukee, WI. [\[Link\]](#)
- James Hermus**, Timothy P. Szczykutowicz, Brian Davis, Erick L. Oberstar, Martin Wagner, Charles M. Strother, and Charles Mistretta. (2014, March). Quantitative analysis of artifacts in 4D DSA: the relative contributions of beam hardening and scatter to vessel dropout behind highly attenuating structures. Poster presented at the *2014 Annual SPIE Medical Imaging Conference*, Proc. 9033, San Diego, CA. [\[Link\]](#)
- CONFERENCE PRESENTATIONS **James Hermus**, Federico Tessari, Rika Sugimoto-Dimitrova, Neville Hogan. (2023, November). Velocity-level planning in human neuro-motor control: behavioral evidence based on Brownian processes. Poster presented at the *2023 Annual Conference of the Society for Neuroscience*, Abstract no. 5698, Washington, D.C.
- Federico Tessari, Chenguang Zhang, Himanshu Akolkar, **James Hermus**, Neville Hogan, Andrew Schwartz. (2023, November). Direction-independent Stiffness Regulation in a Challenging Ballistic Release Tasks Highlights Human Neuro-Motor Performance Limitations. Poster presented at the *2023 Annual Conference of the Society for Neuroscience*, Abstract no. 5627, Washington, D.C.

- CONFERENCE PRESENTATIONS (CONTINUED) Chenguang Zhang, Himanshu Akolkar, Federico Tessari, **James Hermus**, Neville Hogan, Andrew Schwartz. (2023, November). Direction-independent impedance in non-human primates. Poster presented at the 2023 *Annual Conference of the Society for Neuroscience*, Abstract no. 5711, Washington, D.C.
- Himanshu Akolkar, Chenguang Zhang, Federico Tessari, **James Hermus**, Neville Hogan, Andrew Schwartz. (2023, November). Task-dependent stiffness is independent of movement direction and muscle activation. Poster presented at the 2023 *Annual Conference of the Society for Neuroscience*, Abstract no. 5016, Washington, D.C.
- Chenguang Zhang, Himanshu Akolkar, Federico Tessari, **James Hermus**, Neville Hogan, Andrew Schwartz. (2022, December). Arm impedance in different movement directions. Poster presented at the 2023 *Annual Conference of the Society for Neuroscience*, Abstract no. 473.09, San Diego, CA.
- James Hermus**, Johannes Lachner, David Verdi, and Neville Hogan. (2022, May) Exploiting Redundancy to Facilitate Physical Interaction. Talk and poster at the 2022 *IEEE International Conference for Robotics and Automation*, Philadelphia, PA.
- Michael West, Meghan Huber, **James Hermus**, Pauline Maurice, Dagmar Sternad, and Neville Hogan. (2021, April). Humans Do Not Directly Control Force During Motion. Poster at the 2021 *Annual Conference of the Society for the Neural Control of Movement*, Online.
- James Hermus**, Dagmar Sternad, and Neville Hogan. (2020, October). Features of Free Motion Persist in Constrained Actions. Poster at the 2021 *IEEE International Conference on Intelligent Robots and Systems, Workshop on Learning Impedance Modulation for Physical Interaction*, Online.
- Laura Schwendeman, **James Hermus**, Neville Hogan. (2020, October). A Frame-Based Approach to Submovement Decomposition. Interactive talk at the 2020 *Neruomatch Conference*, Online. [\[Link\]](#)
- James Hermus**, Dagmar Sternad, Neville Hogan. (2019, October). Dynamic primitives account for human constrained motion. Poster presented at the 2019 *Annual Conference of the Society for Neuroscience*, Chicago, IL.
- James Hermus**, Dagmar Sternad, Neville Hogan. (2019, May). Features of Free Motion Persist in Constrained Actions. Poster presented at the 2019 *Annual IEEE International Conference on Robotics and Automation: Human movement science for physical human-robot collaboration workshop*, Montreal, Canada.
- James Hermus**, Joseph Doeringer, Dagmar Sternad, Neville Hogan. (2018, July). Physical interaction with a circular constraint. Oral presentation presented at the 2018 *Annual International Society of Electrophysiology and Kinesiology*. Session Motor Control II, Dublin, Ireland.
- Jack A. Martin, Emily M. Keuler, **James R Hermus**, Scott C.E. Brandon, Matthew S. Allen and Darryl G. Thelen. (2017, August). Achilles tendon wave speed tracks joint torque and muscle activity in gait. **Received Best Oral Presentation Award** at the 2017 *Annual American Society for Biomechanics Conference*, Boulder, CO.
- Jack A. Martin, Alexander C. Ehlers, **James R. Hermus**, Matthew S. Allen, Daniel J. Segalman and Darryl G. Thelen. (2017, February). Dynamic imaging of tendon tissue stress. **Received 3rd place award** for the conference paper. Oral presentation at the 2017 *Bi-annual Summer Biomechanics, Bioengineering and Biotransport Conference*, Tucson, AZ.
- Jack A. Martin, Emily M. Keuler, **James R. Hermus**, Mikel R. Stiffler, Matthew S. Allen, and Darryl G. Thelen. (2016, August). Ultrasonic Imaging of In Vivo Achilles Tendon Stress During Walking. Presented at the 2016 *Annual American Society for Biomechanics Conference*, Raleigh, NC.

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| INVITED TALKS | Robotic manipulation from a human motor control perspective. (2024, January). Spotlight talk at the IEEE Robotics and Automation Society Robotics Workshop at EPFL, Lausanne, Switzerland. | |
| | Real Time Adaptive Systems for Human-Robot Collaboration. (2023, March). Invited speaker at the Industry 4.0 Workshop at <i>Swiss Robotics Innovation Booster</i> , Bern, Switzerland. | |
| | Quantifying strengths and weaknesses of human motor control and perception. (2022, May). Invited speaker at the <i>Workshop - Intelligent Control Methods and Machine Learning Algorithms for Human-Robot Interaction and Assistive Robotics</i> as part of the 2022 <i>IEEE International Conference for Robotics and Automation</i> , Philadelphia, PA. | |
| | Human Physical Interaction with a Circular Constraint. (October, 2019). Invited speaker at the <i>UW-Madison Neuromuscular Biomechanics Lab</i> , Madison, WI. | |
| UNIVERSITY SERVICE | Graduate Coach Fellow, MIT | 2020-2022 |
| | <ul style="list-style-type: none"> • Trained as peer- and group-coach facilitator to lead discussions • Program based on International Coaching Federation standards and met weekly • Lead group coaching sessions to empower the professional/personal development of grad students • Learned and practiced valuable team leadership/mentoring skills through a Coach Approach | |
| | Makerworkshop, MIT | 2017-Present |
| | <ul style="list-style-type: none"> • 3D printing Machine Master • Maintained Markforged, Stratasys, and Zortrax 3d printers for student use. • Trained students on 3D printing and consulted on research and personal design projects. | |
| | MIT Outing Club, MIT | 2017-Present |
| ROBOTICS COMMUNITY SERVICE | <ul style="list-style-type: none"> • Treasurer, climbing leader, winter school leader • Lead climbing trips, thought technical rope skills, shared a love for the outdoors. • Managed club financials for the club (over \$100k). | |
| | Workshop Organizer | |
| | <ul style="list-style-type: none"> • <i>IEEE Robotics and Automation Society Robotics Workshop at EPFL</i>. Lausanne, Switzerland. January 10, 2024. • <i>Multilimb Coordination and Learning: an Interplay of Robotics and Human Neuroscience</i>. IEEE International Conference on Intelligent Robots and Systems (IROS). Detroit, MI. October 5, 2023. [Link] | |
| | Reviewer | |
| | <ul style="list-style-type: none"> • Scientific Reports – Nature • IEEE Transactions of Robotics (T-RO) • IEEE Robotics and Automation – Letters • IEEE International Conference for Robotics and Automation (ICRA) • IEEE International Conference on Intelligent Robots and Systems (ROS) • Hindawi Applied Bionics and Biomechanics | |
| SUPERVISION EXPERIENCE | Masters Semester Project Mentees | |
| | Julien Mollard | Fall Semester 2023 |
| | Department of Microengineering, EPFL | |
| | Nathan Benavides | Fall Semester 2023 |
| | Department of Microengineering, EPFL | |
| | Adre Schakkal | Spring Semester 2023 |
| | Department of Microengineering, EPFL | |
| | Undergraduate Mentees | |
| | Jason Salmon | June 2021 - June 2022 |
| | Department of Mechanical Engineering, MIT | |

Laura Schwendeman**December 2019 - May 2021**

Department of Mechanical Engineering, MIT

- Presented an interactive talk at Neuromatch 2020
- John C. and Elizabeth J. Chato Award for Excellence in Bioengineering

Christina Patterson**December 2019 - February 2020**

Department of Mechanical Engineering, MIT

Gabrielle Enns**January 2019 - January 2020**

Department of Mechanical Engineering, MIT

- Prince Innovation Award 2020 – awarded to an undergraduate with a patent/pending patent
- Prince Innovation Award 2021

Haley Higginbotham**August 2018 - May 2019**

Department of Biological Engineering, MIT

Zelin Gong**August 2019 - December 2019**

Department of Computer Engineering, Southern University of Science and Technology

Michael West**May 2017 - August 2017**

Department of Mechanical Engineering, Yale University

- A highlight of the MIT Summer Research Program (MSRP) [\[Video Link\]](#)
- He is now a graduate student in MechE at MIT and a member of the Newman Lab.
- This work was recently published in IEEE RA-L

High School Mentees**Will Carter****July 2019**

IN THE PRESS “Learning challenges shape a mechanical engineer’s path.” MIT News. February 12th, 2023. [\[Link\]](#)

“McBurney Disability Resource Center.” Forward Motion. Big Ten Network. June 12th, 2015 Television. [\[Link\]](#)

“Medical Meets Mechanical.” MechEConnects. Winter 2018, Department Newsletter. [\[Link\]](#)