AUGUST DOMEL

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EDUCATION

STANFORD UNIVERSITY Stanford, CA
Post-Doctoral Scholar, Bioengineering March 2019 - Present
<u>Projects</u>: Helmet design for improved safety and injury prevention due to forceful bodily impacts

HARVARD UNIVERSITY Cambridge, MA
Ph.D., Engineering Sciences: Materials Science and Mechanical Engineering March 2019
Master of Science, Engineering Sciences: Materials Science and Mechanical Engineering March 2016
<u>Thesis</u>: *Bio-Inspired Design for Mechanical and Biomechanical Applications*
<u>Coverage on thesis</u>: National Geographic, Physics World, Newsweek, Condé Nast
<u>Fellowships</u>:
Harvard's SEAS Full Fellowship and Scholarship
Harvard's Peirce Fellowship
Harvard's Winston Chen Fellowship
Harvard's Kao Fellowship
Teaching Fellow: Mechanics of Solids
<u>Harvard Courses</u>: Solid Mechanics, Plasticity and Deformation, Computational Design of Materials, Soft Matter, Computational Fluid Dynamics, Fracture Mechanics, Anatomy and Physiology, Biomaterials, Innovation and Entrepreneurship
<u>MIT Courses</u>: Human Factors Engineering, Structural Mechanics

NORTHWESTERN UNIVERSITY Evanston, IL
Bachelor of Science in Mechanical Engineering June 2014
<u>GPA</u>: 3.99/4.00
Graduated #1 in School of Engineering and Applied Science Class of 2014
Mechanical Engineering Academic Achievement Award 2014
<u>Courses</u>: Advanced Finite Element Stress Analysis, Mechanical Vibrations, Dynamic Systems, Computer Aided Design, Fluid Mechanics, Thermodynamics, Design and Manufacturing, Engineering Analysis I-IV, Engineering Design and Communication I-II, Engineering Mechanics, Electronics Design, Computer Integrated Manufacturing, Machine Elements, Machine Dynamics, Probability, Statistics

PUBLICATIONS AND PRESENTATIONS

- An, Ning*, <u>August G. Domel</u>*, Ahmad Rafsanjani, J. Zhou, and Katia Bertoldi. "Kirigami Surfaces: Programmable Mechanical Response via Hierarchical Design." *Bulletin of the American Physical Society*, Boston, March 4-8, 2019. *co-first authors
- <u>Domel, August G.</u>, Mehdi Saadat, James C. Weaver, Hossein Haj-Hariri, Katia Bertoldi, George V. Lauder, "Shark Skin-Inspired Designs That Improve Aerodynamic Performance." *Journal of the Royal Society Interface* (2018): vol. 15.   <u>Press Coverage</u>*: National Geographic, Newsweek, Physics World, Condé Nast*
- <u>Domel, August G.</u>, Gino Domel, James C. Weaver, Mehdi Saadat, Katia Bertoldi, George V. Lauder, "Hydrodynamic Properties of Biomimetic Shark Skin: Effect of Denticle Size and Swimming Speed." *Bioinspiration & Biomimetics* (2018): vol. 13.
- Zhexin, X.*, <u>August G. Domel</u>*, Ning An, S. Wenguang, Elias Knubben, James C. Weaver, Katia Bertoldi, Li Wen. "A Bio-inspired Soft Robotic Gripper Inspired by the Cephalopod Tentacles." *The Society for Integrative and Comparative Biology*, San Francisco, January 3-7, 2018. Presentation. *co-first authors
- Lauder, G., Dylan Wainwright, Mehdi Saadat, <u>August G. Domel</u>, James Weaver, Madeline Ankhelyi, Meagan Popp, Li Wen, Katia Bertoldi. "Shark Skin: Three-Dimensional Structure and Hydrodynamic Function." *Bulletin of the American Physical Society*, Atlanta, November 20, 2018.
- Saadat, Mehdi, F. E. Fish, <u>August G. Domel</u>, V. Di Santo, George V. Lauder, and Hossein Haj-Hariri. "On the Rules for Aquatic Locomotion." *APS – Physical Review Fluids* (2017): *2*, 083102.

- Moore, John A., Dana Frankel, Rajesh Prasannavenkatesan, <u>August G. Domel</u>, Gregory B. Olson, and Wing Kam Liu. "A Crystal Plasticity-based Study of the Relationship between Microstructure and Ultra-High-Cycle Fatigue Life in Nickel Titanium Alloys." *International Journal of Fatigue* (2013): Vol. 91, Part 1, October 2016, Pages 183–194.
- Saadat, Mehdi, <u>August G. Domel</u>, V. Di Santo, George V. Lauder, and Hossein Haj-Hariri. "Unifying Rules for Aquatic Locomotion." *APS Meeting Abstracts,* November 2016.
- Lauder, George V., Dylan K. Wainwright, <u>August G. Domel</u>, James C. Weaver, Li Wen, and Katia Bertoldi. "Structure, Biomimetics, and Fluid Dynamics of Fish Skin Surfaces." *APS - Physical Review Fluids 1*, 060502, October 18, 2016.
- Samost, Aubrey, David Perlman, <u>August G. Domel</u>, B. Mehler, J. Dobres, B. Reimer. "The Relative Impact of Smartwatch and Smartphone Use While Driving on Workload, Attention, and Driving Performance." *Applied Ergonomics* (2017).
- Samost, Aubrey, David Perlman, <u>August G. Domel</u>, Bryan Reimer, Bruce Mehler, Alea Mehler, Jonathan Dobres, Thomas McWilliams. "Assessing The Relative Impact of Smartwatch and Smartphone Use on Workload, Attention, and Driving Performance in a Driving Simulator." *Human Factors and Ergonomics Society New England Conference*. 2015. Paper.
- Samost, A., D. Perlman, <u>August G. Domel</u>, B. Reimer, B. Mehler, A. Mehler, J. Dobres, & T. McWilliams. "Comparing the Relative Impact of Smartwatch and Smartphone Use While Driving on Workload, Attention, and Driving Performance." *Proceedings of the Annual Meeting of the Human Factors and Ergonomics Society*, Los Angeles, October 26-30, 2015.
- <u>Domel, August G.</u>, Aubrey Samost, David Perlman, Bryan Reimer, Bruce Mehler, Alea Mehler, Jonathan Dobres, Thomas McWilliams. "Assessing The Relative Impact of Smartwatch and Smartphone Use on Workload, Attention, and Driving Performance in a Driving Simulator." *Proceedings of Human Factors and Ergonomics Society New England Conference*. April 17, 2015. Cambridge, Massachusetts. Presentation.
- Moore, John, Ruizhe Ma, <u>August G. Domel</u>, Wing Kam Liu, "An Efficient Multiscale Model of Damping Properties for Filled Elastomers with Complex Microstructures." *Composites Part B: Engineering* (2014): 262-270.
- Pu, W., Choi, J., Olson, T., Amir, E., Girju, C., Park, Y., Vilim, R., and <u>August G. Domel</u>. Description of New PRODIAG Algorithms and Simulation-Based Acceptance Tests, Technical Report, *Argonne National Laboratory* (2013), Illinois.

WORK AND RESEARCH EXPERIENCE

ENGINEERING SYSTEMS INC., *Biomechanical Engineering Intern*, Aurora, IL   Summers 2014 & 2015
- Assisted in a wide variety of accident reconstruction cases, ranging from airplane crashes to slip and fall cases
- Tested and studied different metacarpal and phalanx bone fractures associated with saw injuries, using real human bone mounted in ballistics gel hand matrices as a flesh surrogate
- Performed torque testing of specialty ladders to assist in the development of ANSI A14 ladder twist failure criterion
- Completed research on injuries sustained from vehicular rear impacts

MIT AGELAB, *Researcher*, Cambridge, MA   Oct. 2014 – May 2015
- Evaluated the effect of smart technology on driving capabilities via a driving simulator
- Experimentally assessed the performance of participants on various driving metrics, such as driver workload, attention, etc.

COMPUTATIONAL SOLID MECHANICS LAB, *Research Assistant*, Northwestern (Dr. Wing Liu)   Sept. 2013 – Mar. 2014
- Published a paper discussing homogenized models for filled elastomers, allowing for quicker and more efficient relating of the microstructures of the elastomers to their damping properties
- Performed research on nickel titanium shape memory alloys to better understand and improve their ultra-high cycle fatigue life

NEUROSCIENCE AND ROBOTICS LAB, *Research Assistant*, Northwestern (Dr. Colgate)   May 2011 – Mar. 2014
- Designed and built a device that uses multiple load cells to measure forces exerted by fingers when in contact with surfaces, in order to develop next generation touch screens
- Researched the difference in a person's cognitive perception of a physical surface that is explored using only the index finger, as opposed to also using a thumb in conjunction with the index finger, as part of a pinch grip

ARGONNE NATIONAL LABORATORY, *Research Assistant*, Lemont, IL   Summer 2013
- Designed graphical user interface for a nuclear power plant, enabling diagnosis and management of plant malfunctions from a remote location
- Prepared extensive nuclear power plant analysis report based on 250 trial simulations run using the graphical user interface
- Programmed sequences in Java and Python to diagnose nuclear reactor malfunctions and display results on the graphical user interface

MOTOROLA SOLUTIONS, INC., *Mechanical Engineering Intern*, Schaumburg, IL   Summer 2012
- Developed mockups of radio repeaters to verify cable assembly layout and spacing, and presented the results to team members for analysis and redesign
- Designed 5 different fixture plates and adapters for use by failure analysis team in compressive testing of microphone housings
- Completed tolerance analyses to ensure parts of the different fixture plates and adapters would align
- Performed water immersion testing on radios to identify infiltration locations

MOTOROLA MOBILITY, INC., *Mechanical Engineering Intern*, Libertyville, IL   Summer 2011
- Completed failure analysis and redesign for volume and power buttons of the *Droid Razr* cell phone and presented all redesign changes to mechanical, electrical, and chemical engineering divisions
- Performed deformation testing on *Droid Razr* batteries to determine the maximum damage that prevented their proper functioning
- Prescribed a suggested process of battery removal, based on deformation results, to avoid damage which would prevent continued use of the battery

CERTIFICATIONS AND PATENTS

- Passed PE License Exam (Mechanical)
- Fundamentals of Engineering License #: 061.038010
- OSHA 1910 General Industry 10-hour Certification #: 36-701519745
- Provisional Patent US 2018/0265183 & WO 2018/165313, "Aerodynamic Devices for Enhancing Lift and Reducing Drag"

ACADEMIC PROJECTS

- Modeled auxetic stent for use during angioplasty procedure
- Designed Boeing oxygen mask deployment system to reduce the weight of the current system by 40% while maintaining the same speed and reliability, and then presented the new design to Boeing system safety engineers
- Designed wine opener for Project Revolve that eliminates pain for those with arthritis and other disabilities of the wrist, and presented design with video evidence to Project Revolve's marketing team
- Designed plastic toy spider injection mold to create several hundred toy spiders in a few hours
- Modeled vein expansion and rupture associated with metamaterial stents
- Redesigned p-n junction CdTe Solar Cell to improve theoretical efficiency

LEADERSHIP AND ACTIVITIES

- **DUDLEY HOUSE,** *Fellow*   Aug. 2017 – Present
  - Lead and represent Dudley House (one of Harvard's 13 Houses)
- **ENGINEERS WITHOUT BORDERS,** *Co-Founder and President*   Dec. 2012 – Mar. 2014
  - Assisted in the successful implementation of a water well for a sustainable clean water in Kimuka, Kenya
  - Led design and financial preparations for implementation trip to Kenya
  - Helped build organization to over 100 participating members
- **MECHANICAL ENGINEERING UNDERGRADUATE ADVISORY BOARD**   Sept. 2012 – Mar. 2014
  - Recommended and assisted with changes to mechanical engineering curriculum
- **NATIONAL HONORARY ENGINEERING SOCIETY, TAU BETA PI**   Apr. 2012 – Present
- **INTRAMURAL SPORTS (FOOTBALL, BASKETBALL, AND SOFTBALL)**   Sept. 2010 – Present

SKILLS

- CAD: Solid Works, Unigraphics NX, and Pro/ENGINEER

- FEA: Abaqus, Ansys, and Comsol
- Programming skills: Python, Matlab
- Other: Instron Tensile/Compressive Machine, MircoVu, PSI-Plot, Tolerance Analysis, and Laser Cutting