Ryan Snodgrass

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SUMMARY: Ph.D. mechanical engineer with 8+ years hand-on experience designing/building mechanical and electrical systems. Expertise in thermal engineering, automation, sensors, and precision measurement.

EDUCATION

Cornell University
- Ph.D. Mechanical Engineering. Specialization: thermal systems — 2014 - expected May 2019
- M.S. Mechanical Engineering — 2017

The Ohio State University
- B.S. Mechanical Engineering with Honors Research Distinction, GPA: 3.97/4.00 — 2014

FELLOWSHIPS AND GRANTS

- National Science Foundation Graduate Research Fellow — 2016-2019
- Lead student researcher and co- grant writer on project awarded $3 million from NIH — 2018

PATENTS

Snodgrass, R., Erickson, D., and Cesarman, E. *System and method for isothermal nucleic acid amplification*. PCT number 7674-02-PC. Filed April 10, 2018.

RESEARCH POSITIONS – please see my website for pictures of my work

Graduate Research Assistant - David Erickson Lab - Cornell University — 2014 - present
- Achieved new cold-side temperature record in an elastocaloric refrigerator
- Manufactured first-ever thermal cycler actuated by shape memory alloys
- Built tool that uses sunlight, flame, or electricity to provide health diagnostics to resource limited settings; implemented the device in Uganda; News story 2018, News story 2016

Research Assistant - Microsystems/Nanosystems Lab - The Ohio State University — 2012 - 2014
- Unique synthesis of graphene in a micro-combustor device
- Designed and built an electrical-impedance sensor for hepatic cancer detection
- Awarded research scholarship for writing excellent research proposal ($3300)

DAAD/RISE Research Scholar - University of Freiburg - Baden-Württemberg, Germany — 2013
- Measured ferroelectric properties of ceramic thin films; fabricated devices in a clean room setting

PROFESSIONAL ENGINEERING POSITIONS

R&D Intern - Dow Agrosciences - Indianapolis, IN — Summer 2014
- Designed and built an automatic leaf sampling tool for greenhouse plant sampling
- Wrote an EPSON vision algorithm to find leaves with a camera and three-axis robot

Mechanical Engineering Co-op - Honda Engineering North America - Marysville, OH — Two terms:
- Implemented a novel, automatic windshield priming robot — Winter/Summer 2012
- Published specification sheet detailing a new glass installation machine

PUBLICATIONS

- **Snodgrass, R.** et al. *A portable device for nucleic acid quantification powered by sunlight, a flame or electricity*. Nature Biomedical Engineering, 2018. doi.org/10.1038/s41551-018-0286-y
- **Snodgrass, R.** and Erickson, D. *A multistage, regenerative elastocaloric refrigerator with a 7°C cold-side temperature*. In preparation, expected 2019.
- **Snodgrass, R.** and Erickson, D. *Shape memory alloy driven thermal cycling for nucleic acid quantification*. In preparation, expected 2019.
- **Snodgrass, R.** et al. *KS-Detect - Validation of Solar Thermal PCR for the Diagnosis of Kaposi's Sarcoma Using Pseudo-Biopsy Samples*. PLOS One, 2016. doi.org/10.1371/journal.pone.0147636
- Kopparthy, V., **Snodgrass, R.**, & Erickson, D. *Holographic diagnosis of lymphoma.* Nature Biomedical Engineering. 2018.
- Gumas, A., Ahsan, S., Dogan, B., Jiang, L., **Snodgrass, R.**, et al. *Solar-Thermal Complex Sample Processing for Nucleic Acid Based Diagnostics in Limited Resource Settings*. Biomedical Optics Express, 2015.
- Karnes, M., **Snodgrass, R.**, et al. *Microarray Electrodes for Impedance Imaging and Electrical Characterization of Ex-Vivo Liver Metastases*, Hilton Head Workshop for Solid-State Sensors, Actuators and Microsystems Proceedings, 2014.

- **Snodgrass, R.** and Prakash, S., *Microarray Probe Development for the Imaging of Human Tumors*, Undergraduate Honors Thesis, The Ohio State University, 2014.
- Kellie, B.M., Silleck, A.C., Bellman, K., **Snodgrass, R.**, Prakash, S., *Deposition of Few-Layered Graphene in a Microcombustor on Copper and Nickel Substrates*. Royal Society of Chemistry Advances, 2013.

TECHNICAL SKILLS – please see my website for pictures of my work

Engineering/laboratory: Solid state refrigeration (elastocaloric, magnetocaloric), shape memory alloy implementation and characterization, phase change materials, differential scanning calorimetry, electronics (PCB design and IC implementation), sensors (load cells, thermocouples, photodiodes, etc.), power circuits, optical systems, nucleic acid amplification and quantification, finite element analysis, electrochemical impedance spectroscopy, characterization of ferroelectric materials, thin-film deposition, UV lithography, optical microscopy, Raman spectroscopy, micro-combustion

Software/simulation/programming: MATLAB, C/C++, Arduino, Python, Solidworks (CSWA certified & 8 years experience), COMSOL, LabVIEW, Simulink, Ansys FEA, EAGLE PCB design, EPSON vision algorithms, UNIX programming environment, CATIA V5, Autodesk Inventor, Vision (ferroelectric testing), L-Edit Layout Tool, HTML; numerical method techniques

Manufacturing: Formal mill/lathe training and 5+ years of machining parts, CNC mill operation, rapid prototyping, laser cutting, operation of a MOTOMAN six-axis robot (3 months experience), operation and algorithm-development of an EPSON three-axis robot (3 months experience)

PROFESSIONAL LEADERSHIP AND MENTORING

DAAD/RISE Worldwide Supervisor - Recruited and mentored two German students for research internships

- Paul Benecke, Technische Universität Dresden. Project: nitinol spring characterization — Summer 2018
- Jens Duru, Universität Kassel. Project: PCB design for automated heating control — Summer 2017

Graduate Teaching Assistant - Cornell University

- MAE 3272, Mechanics of materials — Spring 2016
- MAE 4272, Fluid mechanics — Fall 2014

RESEARCH PRESENTATIONS

- **Snodgrass, R.** and Erickson, D. *Methods for elastocaloric cooling below room temperature and cold side temperature record of 7°C*. Shape Memory and Superelastic Technology Conference. — expected 2019
- **Snodgrass, R.** et al. *TINY: A portable and isothermal nucleic acid quantification system heated by sunlight, flame, or electricity*. World of Photonics Conference. — 2017
- **Snodgrass, R.** et al. *TINY: A portable system for nucleic acid quantification in the field using alternative heat sources*. MicroTAS Conference. — 2017
- **Snodgrass, R**. et al. KS-Detect: Solar thermal PCR for the point-of-care diagnosis of Kaposi's sarcoma. Pittcon Conference & Expo. — 2016
- **Snodgrass, R.** and Prakash, S. *Microarray Probe Development for the Imaging of Human Tumors*, Denman Undergraduate Research Forum, The Ohio State University. — 2014
- **Snodgrass, R.** and Fredericksen, E. *Automated Leaf Sampling Proof of Concept*, Summer Intern Research Symposium, Dow AgroSciences. — 2014

LEADERSHIP AND OUTREACH

Comedy FLOPS performer **-** Ithaca, NY — 2017 - present

- Fundraised for a different charity each month by performing improv comedy on-stage

Event Organizer and Webmaster - Sibley Graduate Research Symposium - Cornell University — 2014 - present

- Organized an annual research symposium for engineering students

Founding Member and Webmaster - TEDxOhioStateUniversity — 2010 - 2012

- Assisted in the startup of a thriving student organization; also responsible for group website

Group Leader - Very Sharey Halloween — 2011 - 2013

- Led groups of undergraduates in the largest canned food drive at The Ohio State University

ACADEMIC AWARDS

National Science Foundation Graduate Research Fellow (2016-2019) · Top Academic Award, Department of Mechanical Engineering, The Ohio State University (2012) · The Ohio State University Undergraduate Research Scholarship (2014) · Ada Richard Pressman Engineering Scholarship (2012-2014) · James M. Elliott Engineering Scholarship (2011-2014) · The Ohio State University Maximus Scholarship (2010-2014) · Honda/Ohio State Math Medal Scholarship (2010-2014)