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Amelia M. Elliott

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Education

Post Doc – Manufacturing Systems Research, Oak Ridge National Lab, ***Oak Ridge, TN***
April 2014 – August 2015 : Binder Jet Additive Manufacturing (3D Printing) Research
Ph.D. - Mechanical Engineering, Virginia Tech, ***Blacksburg, VA***
August 2009 – March 2014 GPA: 3.67/4.0
Dissertation title: "Additively Manufactured Physical Unclonable Functions: the Effects of Quantum Dot Nanoparticles on PolyJet Direct 3D Printing."
B.S. - Mechanical Engineering, Tennessee Tech University, ***Cookeville, TN***
August 2004 – May 2009 GPA: 3.58/4.0

Summary of Skills

- Specific expertise in Additive Manufacturing (AM, a.k.a "3D printing") includes inkjet-based polymer and metal AM systems
- Heavily experienced with a variety of AM Systems including Fused Deposition Modeling (FDM), Selective Laser Sintering (SLS), ExOne metal-binder jetting, and Objet PolyJet technology
- Demonstrated ability to manage research projects and personnel to meet research targets
- Demonstrated aptitude for public engagement in science and technical presentations

Relevant Graduate Coursework

ME 5644 - Additive Manufacturing
ME 5124 - Design of Experiments
ME 5744 - Mathematical Methods in Mech. Eng.
ME 5634 - Finite Elements in Machine Design
ENGE 5014 – Foundations in Engineering Education
GRAD 5104 – Preparing the Future Professoriate
ENGE 5404 – Assessment Techniques in Eng. Ed.
ENGE 5024 – Design in Engineering Education

Research Experience and Employment

Oak Ridge National Lab's (ORNL) Manufacturing Demonstration Facility (MDF)

August 2015 – Present – Research Staff

- Lead research in binder jet technology with budget authority greater than $1M
- Conduct research tasks related to binder jet AM, including printing experimental powder systems, maintaining and modifying research equipment
- Consult industry and fellow scientists at ORNL on how best to utilize AM technology
- Mentor student interns and develop workforce pipeline

Aug. 2013-August 2015 – Post Doc/Master's Research Associate

- Served as a Post-Master's RA for 7 months while completing PhD dissertation
- Leader in research in inkjet-based Additive Manufacturing, specific focus is on metals with binder jet with ExOne systems. Manage the machines and develop new technology for new materials.
- Collaborate with industry partners in identifying research avenues and consulting on appropriate AM technologies for their specific applications, educate visitors on AM technologies and applications
- Overall, contribute to research efforts in Additive Manufacturing at the Manufacturing Demonstration Facility by offering expertise obtained from 4 years of graduate work in Additive Manufacturing

August 2009-June 2013 – Virginia Tech Research Associate – Mechanical Engineering DREAMS Lab

- DREAMS (Design, Research, and Education for Additive Manufacturing Systems) Lab member
- Competed dissertation dealing with nanoparticles incorporated into PolyJet photopolymers
- Worked heavily with a variety of AM technologies including Stratasys, Objet, and SinterStations
- Lead the DreamVendor project, the first unit of its kind that any user may insert a 3D model file and get their model printed right in front of them: www.dreams.me.vt.edu/dreamvendor

2006-2010 – NASA Marshall Space Flight Center Huntsville, AL

TTU NASA Engineering Coop Student, 6 work terms (semesters)

- Refined an existing solar motor hardware into a functional prototype that converts solar energy into a cyclical motion (U.S. Patent No. 13/118,086)
- Designed and fabricated an experiment to quantify the effects of lunar dust on simple mechanisms. This project is in conjunction with 3 other NASA centers in preparation for lunar habitation
- Worked in International Space Station (ISS) Payload Operations and Integration Function (POIF) developing training slides to familiarize ISS and Ground Crew with scientific payload operations

Publications & Patents

- Tatum, P. F., III, & Elliott, A. M. (2015). "Thermal Powered Reciprocating Force Motor." U.S. Patent No. 13/118,086. Washington, DC: U.S. Patent and Trademark Office.
- M. Elliott, O. S. Ivanova, C. B. Williams, and T. A. Campbell, "Inkjet printing of quantum dots in photopolymer for use in additive manufacturing of nanocomposites," Advanced Engineering Materials, Volume 15, Issue 10, pages 903–907, October 2013. doi:10.1002/adem.201300020
- Amelia M. Elliott, Olga S. Ivanova, Christopher B. Williams, Thomas A. Campbell; "An Investigation of the Effects of Quantum Dot Nanoparticles on Photopolymer Resin for use in PolyJet Direct 3D Printing." 2012 Solid Freeform Fabrication Symposium, Austin, Texas.
- O.S. Ivanova, A. Elliott, T.A. Campbell, C.B. Williams. (2012). "Additive Manufacturing with Nano-Inks." Nanotech 2012, Vol. 2, 275-278.
- L. Justin Stiltner, Amelia M. Elliott, Christopher B. Williams, Abby R. Whittington; "A Method for Creating Actuated Joints via Fiber Embedding in a Polyjet 3D Printing Process." 2011 Solid Freeform Fabrication Symposium, Austin, Texas.

Invited Talks

- Oak Ridge National Lab's Weinberg Seminar Series: "The Past, Present, and Future of Inkjet-Based Additive Manufacturing." September 9, 2015.
- Alumni Lecture: "Amy, Additive Manufacturing, and the MDF." TTU, Cookeville, TN, March 19, 2015.
- ASME Board Meeting: Kingsport, TN, June 2nd. "Amy, Additive Manufacturing, and the MDF."
- Cannon Trade Show, New York City, Javitz Convention Center, June 10, 2015 "The Next Generation of Materials that will Energize Your Creativity."
- Cannon Trade Show, Toronto, June 16, 2015 "The Next Generation of Materials that will Energize Your Creativity."
- Stacking Layers, "Research at the MDF." FSU, Tallahassee, FL. Feb 19-20, 2015.
- Virginia Tech TEDx 2013: "Refostering Innovation in America. www.youtube.com/watch?v=cPCmQAgknDM
- Keynote: 2013 SWCC Governor's School for Science and Technology – October 26, 2013 "My Path in STEM."

STEM-Related TV and Webseries Hosting

March 2015 – Present – *"Outrageous Acts of Science"* - Science Channel

Expert Host/Commentator, Seasons 3 and 4

- Research popular web clips for interesting, science-related discussion points
- Formulate scientific explanations in a format interesting and reachable to a broad audience
- Recite scientific explanation on camera as well as offer personality and commentary

March 2014 – Present - RoboNation TV (RoboNation.org)

On-Camera Producer, Seasons 1-6

- Travel to and conduct on-camera interviews with leading researchers in the field of Robotics
- Suggest and develop content to for programming related to robotics research and avenues for students interested in robotics to get involved in STEM careers
- Host AUVSI (Association for Unmanned Vehicle Systems International) competitions and conferences
- Perform on-camera as host for each episode

Oct. 2012- Dec. 2012 - The Big Brain Theory - Discovery Channel

Contestant and Finalist, Season 1

- A reality show that challenges engineers to work in teams under extreme constraints to design and build innovative solutions and compete for a grand prize. The season comprised of 8 challenges or "episodes." http://www.discovery.com/tv-shows/the-big-brain-theory
- Placed 2nd overall out of 10 contestants selected from the brightest in the nation
- Won 5 out of 8 blue print challenges (the next highest blue prints won was 2), which lead to 5 captain spots out of the 8 challenges, lead 4 teams to victory

Other Notable Activities in STEM Outreach

The "World's First" 3D Printing Vending Machine – The DreamVendor

Project Manager – Nov. 2011- Nov.2012

- Designed and fabricated kiosk to house 3D printers capable of dispensing printed objects
- Project was focused on giving more students access to 3D printing technology
- Lead a team of graduate and undergraduate students to develop the necessary hardware, software, and electronics to complete the kiosk (http://www.dreams.me.vt.edu/dreamvendor/)
- Lead a team of undergraduates to maintain the kiosk while in use during the semester
- Patent being pursued and currently being licensed

STEM Outreach Workshops, tours, and booths

- Developed and lead training and activities for 4H summer workshops, local Kindergarden to College (K2C) summer camps, and school field trip days
- Travel to local Kid's Tech University annual science fair to demonstrated 3D printing technology and talk with students about STEM careeres
- Give tours to student and all-female student groups at the MDF

Awards and Honors

ORNL Significant Event Award, 2014 • Torgersen Research Award 3rd Place Poster, 2014 • GAANN Fellow, 2010-2011 • TTU Ms. Engineer, 2009 • TTU Engineering Joint Council Scholarship, 2006 • Dean's List 04-present • NASA Robotics Academy Alumni, 2005 • TTU Honors Program 04-07