June 12, 2026

Thomas A. Campbell, Ph.D.

Co-founder & Growth Director, LEAP Manufacturing
Growth Advisor, BEACONS
Founder & CEO, FutureGrasp

+001 (571) 748-8094, tom@leapmanufacturing.com, tom.campbell@futuregrasp.com
29851 Stagecoach Blvd, Evergreen, Colorado 80439 USA
https://www.linkedin.com/in/ThomasAndrewCampbell, @FutureGrasp
Google Scholar, ResearchGate

EDUCATION

Ph.D., Aerospace Engineering Sciences, University of Colorado at Boulder; Boulder, Colorado, USA; Dissertation: *The Influence of Compositional Effects upon InSb Crystal Growth*; funded by 3-year NASA Graduate Student Research Program (GSRP) fellowship; Adviser: Prof. Jean Koster

M.S., Aerospace Engineering Sciences, University of Colorado at Boulder; Boulder, Colorado, USA; Thesis: *An Experimental Investigation of Liquid Metal Flows*; Adviser: Prof. Jean Koster

B.E., Mechanical Engineering with Honors, Vanderbilt University, Nashville, Tennessee, USA; Honors Thesis: *The Ti-W Phase Diagram—Is It Correct?*; Adviser: Prof. Taylor G. Wang (NASA astronaut, STS-51B, Challenger); *Magna Cum Laude*

CURRENT POSITIONS

LEAP Manufacturing, Evergreen, CO USA and Austin, TX (2/2023-Present)
- *Co-founder & Growth Director*

The LEAP Manufacturing consortium is building a research and industry partnership designed to be the leading force for accelerating advanced energy systems (specifically, new sustainable batteries for national security, U.S. Department of War). Our objective is twofold: (1) foster creation of new battery chemistries for storage, and (2) develop techniques to minimize use of materials in increasingly short supply across an ecosystem of domestic manufacturers.

FutureGrasp, Evergreen, Colorado USA (8/2017-Present)
- *Founder & CEO*

FutureGrasp enables its clients to lead in times of rapid technology change. Leveraging our deep technical, policy, and business expertise, we identify not only technology trends, but also assess what those trends mean short- and long-term via rigorous due diligence and data analysis. Clients and collaborators include senior policymakers within the United States and foreign governments, international government organizations (United Nations, INTERPOL), corporate C-suite, startups (advising and creation), investors (venture capital, angel investors, private equity), think tanks, and universities. Based in Evergreen, Colorado (just West of Denver), FutureGrasp is well-positioned to serve the global community.

Council on Competitiveness, Washington, D.C. (8/2017-Present)
- *Senior Fellow*

Assisting the Council on Competitiveness in:
- Development of over-the-horizon initiatives and continuing work on longstanding Council leadership in areas such as the nation's innovation capacity
- Identification of strategic new partners and individuals who can help support the Council's mission and strengthen its core membership

- Efforts to enhance awareness of the Council and its work with key stakeholders in government, the media and the private sector

Global TechnoPolitics Forum, Canoga Park, CA USA (1/2019-Present)

➢ *Advisory Board Member*

Serving as advisory board member to senior leadership on issues relevant to the intersection of technology and geopolitics

PAST EMPLOYMENT & TRAINING

BootstrapLabs, San Francisco, California

➢ *Government Liaison and Advisor, Venture Studio for Energy and Climate (6/2022-6/2024)*

- Advise on new business opportunities
- Make introductions to potential stakeholders, investors, partners, or other relevant parties
- Work with the Head of BootstrapLabs Venture Studio for Climate and Energy to drive their objectives

➢ *Special Advisor (12/2017-6/2024)*

Supporting BootstrapLabs as a special advisor for Applied AI intellectual property & product development - foci include:

• Near and far-horizon perspectives on potential directions and market opportunities

• Assisting BootstrapLabs to expand its network reach, especially into new industry and government sectors

• "Connecting the dots" with BootstrapLabs on disparate technology sectors that might benefit from Applied AI

ACMI Group, Austin, Texas (9/2023-11/2023)

➢ *Senior Advisor, Strategy*

Focus on strategy and capture of new projects in hypersonics, space systems, additive manufacturing, robotics, and biosynthesis.

Office of the Director of National Intelligence (ODNI), McLean, Virginia USA (2/2015-8/2017)

➢ *National Intelligence Officer (NIO) for Technology, National Intelligence Council (NIC)*

- Served as the focal point within the ODNI for all activities related to emerging and disruptive civil technologies. In collaboration with other NIOs and government agencies, topics covered included, but were not limited to, artificial intelligence (AI) & big data analytics, biotechnology (genome editing), next-generation semiconductors, technology forecasting, internet of things / everything, 3d-printing (additive manufacturing), 4d-printing (programmable matter), cybersecurity, wireless communications, autonomous vehicles.

- Drafted, coordinated intelligence community reviews of, and briefed a broad portfolio of intelligence products—including the National Intelligence Estimate (NIE), Intelligence Community Assessment (ICA), National Intelligence Council Report (NICR), and others—for senior policymakers—including the National Security Council, Senators, Congressmen, and the Department of Defense

- Managed a team of deputies, assignees, and strategic support

- Established and managed liaison relationships with academia, industry, and others to ensure the intelligence community has a comprehensive understanding of technology and its intersection with global military, security, economic, financial and energy issues
- Contributed as a technology author and reviewer of the NIC's *Global Trends: Paradox of Progress*

Virginia Tech, Institute for Critical Technology and Applied Science (ICTAS), Blacksburg, Virginia USA (8/2008-12/2014)

➢ *ICTAS Associate Director for Outreach (8/2010-12/2014); ICTAS Associate Director for Special Projects & Outreach (1/2010-8/2010); ICTAS Associate Director for Special Projects (8/2008-1/2010)*

- Led corporate outreach and facilitated large, multi-principal investigator (PI) program and proposal developments in interdisciplinary areas, including internet of things / everything, 3d printing (additive manufacturing), 4d printing (programmable matter), big data, cybersecurity, wireless communications, autonomous vehicles, nanotechnology, bio-nanotechnology, nanomedicine (targeted drug delivery), nanometrology, materials processing, sensors, water, biomedical engineering, environmental health & safety, and mechanical and aerospace engineering
- Facilitated commercialization of faculty research into spin-offs, joint ventures, and licensing
- Organized and facilitated national and international outreach for ICTAS, including establishing an innovation research center on every continent (Asia, Australia, South America, Europe, Africa), and organizing and running major conferences (including Nobel Laureate keynotes)
- Developed contacts database of more than 3,000 researchers, program managers, and policy makers in federal agencies, universities, national laboratories, and think tanks

➢ *Assistant Director for Research and Operations, Virginia Tech Carilion Research Institute (VTCRI, research arm of the Virginia Tech-Carilion School of Medicine); Program Manager, ICTAS (8/2008-7/2009)*

- Coordinated requests for proposals (RFPs) within VTCRI for medical research
- Led ICTAS efforts in nanotechnology and bio-nanotechnology, including new project and proposal initiation

➢ *Research Associate Professor (8/2008-12/2014); Affiliate Faculty, School of Biomedical Engineering and Sciences (SBES, 2010 to 2014)*

- Built a research lab from scratch and performed fundamental research on nanomaterials and 3d- and 4d-printing
- Principal proposal writer to operate nanomaterials lab (see Funding Record below)
- Managed one postdoctoral researcher, one Ph.D. student, and several M.S. students

- Frequently called upon by journalists as an expert in 3d and 4d printing – interviewed by *The Economist, Washington Post, Bloomberg News, Vantage, Future Lab, National Public Radio (NPR), International Business Times, National Journal, Corporate Knights Magazine*; filmed interviews by the Science & Technology Innovation Program at the Woodrow Wilson Center for a documentary on the use of Additive Manufacturing processes in prototyping and manufacturing, and the Institute for Creativity, Arts and Technology (ICAT) of Virginia Tech on interdisciplinary approaches in research
- Frequent invited speaker (disruptive technologies, 3d printing, nanotechnology, etc.) – talks given to Thomson-Reuters; National Security Council (White House, Washington, D.C.); British Embassy (Washington, D.C.); Food & Drug Administration; Council on Foreign Relations (New York City); Atlantic Council; Pentagon; DARPA; Office of Secretary of Defense; Office of Naval Research; National Defense University; US State Department; NASA; NIST; CIA

National Institute of Standards and Technology (NIST), Gaithersburg, Maryland USA
- *Contract Guest Researcher, United States Measurement Systems (USMS) Group (12/2007-9/2009)*
  - Assisted in interviews, research, documentation and presentation of USMS assessments of measurement needs of nanotechnology environmental health and safety (Nano-EHS)

ADA Technologies, Inc., Littleton, Colorado, USA, 2005-2008
- *Senior Research Scientist / Nanotechnology Program Manager (1/2007-8/2008)*
- *Senior Research Scientist, Instrumentations Group (8/2005-12/2006)*
  - Led proposal concept, writing, and project execution of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) proposals
  - Developed characterization equipment of carbon nanotubes
  - Developed Laser Induced Breakdown Spectroscopy (LIBS) system for phyto-remediation studies (technique for quantifying absorption of toxic metals in plants)
  - Test validation engineer for *WeatherPod*^{TM} system, a compact meteorological package for the Department of Defense

Stanford University Engineering & Science Institute – Nanoscience & Nanotechnology Center for Professional Development Program, 2005, Nine-Course Certificate Program

Saint-Gobain Crystals, Solon, Ohio, USA, 1999-2004
- *Research Scientist, R&D (2000 to 2004)*
- *Process Development Engineer, Manufacturing (1999-2000)*
  - PI and R&D Project Leader during **$13 million-dollar** expansion project (on time and within budget) of optical microlithography materials (193nm and 157nm), data acquisition and analysis projects, and optical and scintillating materials growth, annealing, and characterization projects

- Initiated and acted as R&D liaison in numerous collaborations with academic, government and industrial laboratories; represented R&D during customer visits and conferences worldwide (U.S., Europe, Japan)
- Wrote nine (9) invention disclosures with one patent pending; authored over 100 peer-reviewed, confidential technical memos and reports, including white papers of marketing/R&D surveys of new materials applications and patent reviews
- Developed literature database of >1,600 references
- Managed students (co-ops), technicians and scientists in multiple projects; had up to five (5) direct reports at one time

Kristallographisches Institut, Universität Freiburg, Freiburg, Germany, 1998 to 1999

- *Alexander von Humboldt Research Fellow* - all research executed in the German language after taking four-month intensive course at Goethe Institut, Freiburg, Germany (starting from no knowledge of German upon arrival in Germany)
- ***Funding from Alexander von Humboldt Foundation Research Fellowship***; Advisers: Prof. Dr. K.W. Benz, Prof. Dr. Arne Cröll
  - Project: "Toward a Better Understanding of Ge-Si Crystal Growth and its Implications for Semiconductor Processing"
  - Developed and implemented novel experimental studies of interfacial kinetics and crystal characterizations of germanium-silicon compounds

MEMC Electronic Materials, Inc., St. Peters, Missouri, USA, 1997

- *Staff Engineer*
  - Engineered Czochralski crystal growth of 300mm diameter silicon crystals: designed and implemented accessory calibration devices, developed and implemented historical tracking and analysis database

Gravitational Fluid Mechanics Laboratory, University of Colorado, Boulder, CO, USA, 1991-1996

- ***Ph.D. funding from 3-year NASA Graduate Student Researcher Program Fellowship; NASA Adviser: Dr. Frank Szofran, NASA Marshall Space Flight Center***
  - Developed, constructed and implemented an *in-situ*, real-time visualization capability using non-intrusive X-ray radioscopy to study opaque semiconductor materials and liquid metals, *ca.* $1.0 million worth of equipment
  - Researched convective fluid mechanics using laser holography with tracer particles in model transparent fluids

Saturn Corporation; Troy, Michigan; Summer of 1990

- *Engineering Intern, Outer Body Doors*
  - Assisted roll-out of first production vehicle in Spring Hill, Tennessee

General Motors Corporation; Detroit, Michigan; Summer of 1989

- *Engineering Intern, Outer Body Components, Model A Car Group*

HONORS AND AWARDS

- ***Program/Steering Committee Member, AI Pioneers Forum –*** "The mission of AI Pioneers Forum is to create an evolving digital manifesto which delivers a future roadmap to real returns on AI," 2018 to 2019.
- ***2014 Outstanding Paper Award -*** Olga S. Ivanova, Christopher B. Williams, Thomas A. Campbell (2013), "Additive Manufacturing (AM) and Nanotechnology: Promises and Challenges," *Rapid Prototyping Journal*, Volume 19, Issue 5, 353-364, http://www.emeraldgrouppublishing.com/authors/literati/awards.htm?year=2014&journal=rpj
- **Senior Fellow (Non-resident), Brent Scowcroft Center on International Security, Strategic Foresight Initiative, Atlantic Council –** http://www.atlanticcouncil.org/programs/brent-scowcroft-center/strategic-foresight - 2013 to 2014.
- Attendee at invitation-only ***Global Trends 2030—A US Strategy for a Changing World***, December 10-11, 2012, Newseum, Washington, D.C.
- Two figures of Additive Manufacturing systems from the Laboratory for Engineered Nano-Systems (LENS) published with acknowledgement to ICTAS / Virginia Tech in the *Wohlers Report 2012, 2013—Additive Manufacturing and 3D Printing State of the Industry, Annual Worldwide Progress Report*.
- ***Best Paper Award*** - "Metrology for Additive Manufacturing—Opportunities in a Rapidly Emerging Technology," Metromeet 2012 (March 8-9, 2012); 8th International Conference on Industrial Dimensional Metrology; Bilbao, Spain.
- Invited participant for Annual Academic Reputation Survey to support the World University Rankings, Thomson Reuters and Times Higher Education, 2011 to present.
- **Member of Board of Directors of the American Friends of the Alexander von Humboldt Foundation**; Chair of Strategic Planning Standing Committee and Humboldt Kolleg 2012 Committee, 2010 to February 2015, http://www.americanfriends-of-avh.org/
- Cited as a "Key Player" in Frost & Sullivan report *Carbon Nanotubes–Road to Commercialization*, 2007
- Ambassador Scientist Abroad and U.S. Humboldtian on Campus, Alexander von Humboldt Foundation, 2007 to 2013
- "Rookie of the Year," ADA Technologies, Inc., 2006
- Design contest winner, North American R&D Orientation Seminar, Saint-Gobain Corporation, 2004
- Case Western Reserve University, Cleveland, Ohio; Fundamentals of Management, 2001
- **Alexander von Humboldt Research Fellowship**, Albert-Ludwigs-Universität, Freiburg, Germany, 1997-1999
- **NASA Graduate Student Researcher Program Fellowship**, Marshall Space Flight Center, Huntsville, Alabama, 1993-1996

- *Magna Cum Laude*, Honors in Mechanical Engineering, Vanderbilt University, 1991
- Best Technical Presentation Award, American Society of Mechanical Engineers Regional Conference, Tampa Bay, Florida, 1990
- Mechanical Engineering Honors Program, Vanderbilt University, 1990-1991
- President, Pi Tau Sigma Mechanical Engineering Honor Society, Vanderbilt University, 1990-1991
- Sabre Team Captain, Fencing Club, Vanderbilt University, 1989-1990
- Member, Tau Beta Pi Engineering Honor Society, Vanderbilt University, 1990
- Member, Gamma Beta Phi Honor Society, Vanderbilt University, 1990
- Eagle Scout & Order of the Arrow, Boy Scouts of America, 1984
- "Class A" Caddy, Inverness Club (PGA Championship golf course), Toledo, Ohio, 1983-1987.

PROFESSIONAL ACTIVITIES

Journal Reviewer

- *International Journal of Production Economics*, Elsevier Sciences, (Impact Factor=2.081), 2014 to 2015.
- *Journal of International Commerce and Economics* (JICE): http://www.usitc.gov/journals/, internal journal of the US International Trade Commission, 2014 to 2015.
- *Global Policy* (Impact Factor=1.206), 2013 to 2015.
- *Ceramic Transactions Proceedings*, 2013 to 2015.
- *Rapid Prototyping Journal* (Impact Factor=0.72), 2012 to 2015.
- *Nano Today* (Impact Factor=18.432), 2011 to 2015.
- *Journal of Nanoscience and Nanotechnology* (Impact Factor=1.435), 2008 to 2015.
- *Journal of Applied Ceramic Technology* (Impact Factor=1.384), 2008 to 2015.

Proposal Reviewer

- International Graduate School of Science and Engineering (IGSSE, http://www.igsse.tum.de/), Technical University of Munich, Munich, Germany, 2014.
- Masdar Institute, Abu Dhabi, United Arab Emirates, 2013.
- National Science Centre (Narodowe Centrum Nauki - NCN; http://www.ncn.gov.pl, Poland), 2013.
- "*Measures to Attract Leading Scientists to Russian Educational Institutions*" program by the European and International Cooperation located at the Project Management Agency, c/o German Aerospace Center (DLR), in Bonn, Germany, 2012 to 2013.

- US National Science Foundation (NSF) review panels - five panels, 2008 to 2012.

Professional Societies (Member)

- MIT Technology Review Global Panel, 2019 to Present.
- American Association for the Advancement of Sciences, 2003 to Present.
- Materials Research Society, 1995 to Present.
- American Association for Crystal Growth, 1995 to 2005.

Other

- Technical expert witness on legal proceedings for disruptive technologies, 2014 to Present.
- Attendee and participant at the invitation-only *Global Innovation Summit,* April 9-10, 2014, at the Atlantic Council and the US Department of State.
- Attendee at invitation-only *Thunderstorm Spiral 14-1: Threat Convergence Analysis*, March 26-27, 2014, sponsored by the Rapid Reaction Technology Office, Emerging Capabilities Division within the Office of the Assistant Secretary of Defense (R&E) – purpose to examine homeland security implications of the convergence of sub-state threat groups with emerging technological trends.
- Invited game-player on *Massively Multiplayer Online War Game Leveraging the Internet*, focused on new capabilities for the military in Additive Manufacturing (3D Printing), 2014.
- Attendee at invitation-only DARPA/ISAT workshop on *Rethinking CAD*, Arlington, VA, October 24-25, 2013.
- ISO/QS-9000 Internal Auditing – certified auditor, 2000.

ODNI SUPERVISION

1. Deputy National Intelligence Officer for Technology, November 2015 to August 2017.
2. NIC Assignee, September 2016 to August 2017.
3. Analytic Program Manager, October 2016 to August 2017.

POST-DOCTORAL FELLOWS SUPERVISION

1. Olga S. Ivanova, Virginia Tech, February 2011 to July 2013.

OHER SUPERVISION

1. Grzegorz Slawinski, Part-time Researcher, Virginia Tech, February 2013 to July 2013.

GRADUATE STUDENT SUPERVISION

Ph.D. Students

1. Konrad Schraml, Technical University of Munich (defended successfully 2018); co-advised with Prof. Dr. Jonathan Finley of the Department of Physics, TUM.

2. Amy Elliott, Virginia Tech, 2011-2014 (defended successfully February 17, 2014), served on dissertation committee; thesis advisor Prof. Chris Williams of the Department of Mechanical Engineering and the Department of Engineering Education.

M.S. Students (Virginia Tech)

1. Earl Campaigne, M.S. student, 2012-2014, (defended successfully June 14, 2014), served on dissertation committee, advisor Prof. Chris Williams of the Department of Mechanical Engineering and the Department of Engineering Education.
2. Ivan Hanzlicek, M.S. student, 2013, served as supervisor on project "Computational Modeling of Stereolithography," Technical University of Munich, advisor Prof. Stefan Kollmannsberger, Department of Civil Engineering and Surveying, Chair for Computation in Engineering
3. Máté Péntek, M.S. student, 2013, served as supervisor on project "Computational Modeling of Stereolithography," Technical University of Munich, advisor Prof. Stefan Kollmannsberger, Department of Civil Engineering and Surveying, Chair for Computation in Engineering
4. Pegah Ghanbari, Ph.D. student, 2009-2011, supervised her activity on two subcontracts from ADA Technologies, Inc. to Virginia Tech.

Industrial Interns (supervised at Saint-Gobain Crystals & Detectors)

1. Brian Skinn, industrial intern, 2001 and 2003; Brian later received his Ph.D. from the Massachusetts Institute of Technology (MIT)
2. Yong Li, industrial intern, 2002

NATIONALITY

U.S. citizen (natural born)

LANGUAGES

English—native speaker

German—professional working proficiency

French—reading ability

INTERVIEWS

aiTechTrend Interview with Thomas Campbell, Founder & CEO at FutureGrasp, May 22, 2021, aiTechTrend,

'A breath of fresh air': What futurists have to say about a Biden presidency, November 9, 2020, *The National News,*

Preventing The Unraveling Of America: A New All Inclusive Digital Society Roadmap With US Sustainable Development Goals,' August 28, 2020, *Forbes,*

Protecting the Homeland By Forecasting the Impact of Emerging Technology, September 18, 2015, *The National Journal*; *The Atlantic*,

https://www.theatlantic.com/politics/archive/2015/09/protecting-the-homeland-by-forecasting-the-impact-of-emerging-technology/439776/

PUBLICATIONS

US Government (listed are only those with UNCLASSIFIED titles; *=self-authored, otherwise facilitated as NIO for Technology; ICA=Intelligence Council Assessment, NICR=National Intelligence Council Report, To-From Memo=memo to specific senior policymaker, NICM=National Intelligence Council Memorandum, SOCM=Sense of Community Memorandum)

1. "(U) Artificial Intelligence (AI) Will Eat Software: Economic and Security Implications of AI's Dominance," NICR, 23 June 2017.*
2. "(U) Digital Technologies Present Opportunities and Risks to the Economy," NICR, 31 May 2017.*
3. "(U) CES 2017: Artificial Intelligence and Other Technologies Go Mainstream, Presenting New Challenges to National Security," NICR, 20 March 2017.*
4. "(U) Conference Report: Artificial Intelligence Workshop Identifies Potential National Security Implications, 7-8 July 2016," NICR, 30 November 2016.*
5. "(U) Artificial Intelligence Workshop Identifies Potential National Security Implications, 7-8 July 2016, NICR, 27 September 2016.
6. "(U) Artificial Intelligence: Background Report from Outside Experts," NICR, 12 September 2016.*
7. "(U) Life Sciences: Key 2016 California Insights and Perspectives," NICR, 1 September 2016.
8. "(U) Artificial Intelligence: Global Progress and National Security Issues," SOCM, 24 June 2016.
9. "(U) The 2016 Applied Artificial Intelligence (AI) Conference in San Francisco," NICR, 22 June 2016.*
10. "(U) NIC Visit With Deputy Secretary of Defense to Carnegie Mellon University on Third Offset Technologies," NICR, 21 June 2016.*
11. "(U) Highlights from the International Summit on Human Gene Editing, 1-3 December 2015," NICR, 31 March 2016.
12. "(U) Moore's Law 2.0," NICR, 25 March 2016.
13. "(U) Consumer Electronics Show (CES) 2016: Key Findings," To-From Memo, 3 March 2016.*
14. "(U) Artificial Intelligence: A Baseline," ICA, 6 November 2015.
15. "(U) Technology Trends through 2035: Implications for US National Interests," NICM, 28 August 2015.
16. "(U) Augmented and Virtual Reality: Opportunities and Risks," NICR, 26 August 2015.

Intellectual Property

Patents Issued

1. Roper, William, Jr.; Benson, Christopher; Phan, Long N.; **Campbell, Thomas A.;** DeBitetto, Paul A.; Sarma, Sanja Emani; "Security System for an Unmanned Vehicle," Assignee: Istari Digital, Inc., United States Patent US 12,358,642 B2, July 15, 2025.
2. **Campbell, T.A.**; Henry, K.D. "Carbon nanotube nanometrology system," Assignee: ADA Technologies, Inc., United States Patent US 7,564,549 B2, July 21, 2009.
3. Rylander, C.; **Campbell, T.A.**; Wang, Ge; Xu, Y.; Kosoglu, M.A.; "Fiber Array for Optical Imaging and Therapeutics," Assignee: Virginia Tech, US Patent No.: 8,798,722 B2; August 5, 2014.

Patent Applications

1. Fabio Ficano, Erik Stark, Daniel Riedel, **Thomas Campbell**, Shmuel Silverman, "AUTOMATED PROJECT PLANNING FOR A DISTRIBUTED POWER SYSTEM," Assignee: BootstrapLabs IP Ventures, LLC, United States patent application, filed February 14, 2024.
2. Fabio Ficano, Erik Stark, Daniel Riedel, **Thomas Campbell**, Shmuel Silverman, "DISCOVERY OF POWER-SYSTEM PROJECTS," Assignee: BootstrapLabs IP Ventures, LLC, United States patent application, filed February 14, 2024.
3. Fabio Ficano, Erik Stark, Daniel Riedel, **Thomas Campbell**, Shmuel Silverman, "AUTOMATED ADAPTATION OF A PLAN FOR A POWER-SYSTEM PROJECT," Assignee: BootstrapLabs IP Ventures, LLC, United States patent application, filed February 14, 2024.
4. William B. Roper, Christopher Benson, Long N. Phan, **Thomas A. Campbell,** Paul A DeBitetto, Sanjay Emani Sarma, "Security System for an Unmanned Vehicle," Assignee: Istari, Inc., United States application or PCT international application number 17/903,730, filed September 6, 2022.
5. **Campbell, T.A.;** C.B. Williams; O.S. Ivanova; A. Elliott, "Method of Fabrication of Physically Unclonable Functions via Additive Manufacturing," Assignee: Virginia Tech, International Patent Application No. PCT/US14/66656; filed November 21, 2014.
6. Rylander, C.; **Campbell, T.A.**; Wang, Ge; Xu, Y.; Kosoglu, M.A.; "Fiber Array for Optical Imaging and Therapeutics," Assignee: Virginia Tech, International Patent Application No.: WO 2010/099548 A2, filed March 1, 2010; *expired*.
7. **Campbell, T.A.**; Rylander, M.N.; Dorn, H.C.; "Carbonaceous Nanomaterials as Imaging and Therapeutic Enhancers," Assignee: Virginia Tech, US Patent Application No.: 61/251,349, filed October 14, 2009; *expired*.
8. **Campbell, T.A.**, "Carbon nanotube purification and separation system," Assignee: ADA Technologies, Inc., United States Patent Application 2008/0069758 A1, filed May 8, 2007.
9. Foise, J.W., **Campbell, T.A.**, "Annealing method for halide crystal," Assignee: Saint-Gobain Crystals, United States Patent Application 2004/0231582 A1, filed November 25, 2004.

10. Foise, J.W., **Campbell, T.A.**, "Annealing method for halide crystal," Assignee: Saint-Gobain Crystals, WO 2004/079058 A1, International Patent Application filed under the Patent Cooperation Treaty (PCT), filed 25 February 2004.

Provisional Patents

1. **Campbell, T.A.;** Williams, C.B.; Ivanova, O.S.; Elliott, A.M.; "Fabrication of Physically Unclonable Functions via Additive Manufacturing," US Patent Application # 61/906,927, filed November 21, 2013; ***under exclusive licensing option, 5-21-14 to 5-20-15.***
2. **Campbell, T.A.;** Ivanova, O.S., "Anti-counterfeiting System for Textiles," U.S. Patent Application No: 61/775,762, filed March 11, 2013; *expired*.
3. Ivanova, O.S.; **Campbell, T.A.**; "Synthesis of Quantum Dot Squares"; United States Provisional Patent; U.S. Patent Application No.: 61/548,959; Assignee: Virginia Tech; VTIP 12-052, filed October 19, 2011; *expired.*
4. **Campbell, T.A.**; Ivanova, O.S.; Williams, C.B.; "Quantum Dot Optical Temperature and Pressure Probes Embedded in 3D Objects"; United States Provisional Patent; U.S. Patent Application No: 61/538,495; Assignee: Virginia Tech; Patent Filing Date: September 23, 2011; *expired.*
5. Joseph, E.; Cornelius, C.; Long, T.; Baird, D.; **Campbell, T.A.**; "Nano Foam Structures from Multi Layer Constructions"; United States Provisional Patent; Assignee: Virginia Tech, filed March 30, 2009; *expired.*
6. Rylander, C.; **Campbell, T.A.**; Xu, Y.; "Nanoneedle for Optical Bio-imaging and Therapeutics in Subcutaneous Skin"; Assignee: Virginia Tech, United States Provisional Patent, filed May 21, 2008; *expired.*
7. Dorn, H; Rylander, M.N.; **Campbell, T.A.**, "Carbonaceous Nanomaterials for Imaging and Treatment," Assignee: Virginia Tech, United States Provisional Patent, filed November 27, 2007; *expired.*
8. **Campbell, T.A.**, "Carbon Nanotube Nanometrology of Charge Carrier Dynamics," Assignee: ADA Technologies, Inc., United States Provisional Patent, filed August 8, 2007; *expired.*

Invention Disclosures

1. **Campbell, T.A.**, "Anti-counterfeiting system from nanomaterials-based radio signals," Invention Disclosure, VTIP 13-087; Assignee: Virginia Tech, filed January 11, 2013.
2. **Campbell, T.A.;** Ivanova, O.S., "Additive Manufacturing with Ellipsoidal Mirrors," Invention Disclosure, VTIP 12-133; Assignee: Virginia Tech, filed April 28, 2012.
3. **Campbell, T.A.**; Ivanova, O.S.; Williams, C.B., "Smart Camouflage," Invention Disclosure VTIP 12-115; Assignee: Virginia Tech, filed April 4, 2012.
4. **Campbell, T.A.**; Williams, C.B.; Ivanova, O.S., "Feedback Monitoring and Control Capability through Nanomaterials for Additive Manufacturing Processes," Invention Disclosure VTIP 12-0824; Assignee: Virginia Tech, filed January 24, 2012.
5. Ivanova, O.S.; **Campbell, T.A.**; Williams, C.B., "Personalized Body Armor through

Additive Manufacturing," Invention Disclosure VTIP 12-038; Assignee: Virginia Tech, filed September 14, 2011.

6. **Campbell, T.A.**, "Internet-enabled Contact Lens," Invention Disclosure; Assignee: Virginia Tech, IP Disclosure VTIP 11-122, filed May 12, 2011.
7. **Campbell, T.A.**; Sriranganathan, N.; Bose, T., "Pathogen and Allergen Detection via Mobile Technology," Invention Disclosure; Assignee: Virginia Tech, Invention Disclosure VTIP 11-093, filed March 25, 2011.
8. **Campbell, T.A.**; Williams, C.B., Lu, P., "Programmable Matter via 3D Printing of Nanomaterials," Invention Disclosure VTIP 11-069; Assignee: Virginia Tech, filed December 21, 2010.

Book Chapters

1. **Thomas A. Campbell** (2020), "Cybersecurity in AI National Strategies," AI In The Age Of Cyber-Disorder: Actors, Trends And Prospects, ISPI and Brookings Institute, November 23, 2020, https://www.ispionline.it/en/pubblicazione/ai-age-cyber-disorder-28309
2. **Thomas A. Campbell,** John Slotwinski (2013), Metrology for Additive Manufacturing—Opportunities in a Rapidly Emerging Technology, Advances in Engineering Research, Volume 7, Nova Publishers, Inc., Hauppauge, NY,

Reports

1. **Thomas A. Campbell,** "Countering China, Inc., for National Security," (October 31, 2024), written for the Senate and House of Representatives.
2. **Thomas A. Campbell,** "Biomanufacturing: Threats to National and Economic Security," (February 3, 2023), written for a US Government agency.
3. **Thomas A. Campbell,** "Multilateral Technology Alliances," (July 20, 2022), written for a US Government agency.
4. **Thomas A. Campbell,** "Foreign Equivalents of Silicon Valley," (April 9, 2022), written for a US Government agency.
5. **FutureGrasp** with Advisory Support from the United Nations Interregional Crime & Justice Research Institute (UNICRI), (July 15, 2019) ***REPORT: Artificial Intelligence: An Overview of State Initiatives*.**

Refereed Publications

1. K. Schraml, M. Spiegl, M. Kammerlocher, G. Bracher, J. Bartl, **T. Campbell,** J. J. Finley, M. Kaniber (2014), Optical properties and interparticle coupling of plasmonic bowtie nanoantennas on a semiconducting substrate, *Physical Review B,* 90, 035435,
2. O. Ivanova, A. Elliott, **T. Campbell,** C.B. Williams (October 2014), Unclonable Security Features for Additive Manufacturing, *Additive Manufacturing*, 1–4, 24–31*,*
3. Amelia Elliott, Olga Ivanova, Christopher Williams, **Thomas Campbell,** (October 2013) Inkjet Printing of Quantum Dots in Photopolymer for use in Additive Manufacturing of Nanocomposites, (2013) *Advanced Engineering Materials*, 15 (10), 903–907.

4. **Thomas A. Campbell**, Olga S. Ivanova (2013) "3D Printing of Multifunctional Nanocomposites," *Nano Today,* 8, 119-120.
5. **Thomas A. Campbell,** Olga S. Ivanova (2013), "Additive Manufacturing as a Disruptive Technology—Implications of Three-Dimensional Printing," *Technology and Innovation,* Volume 15, Number 1, 67-79.
6. Olga S. Ivanova, Christopher B. Williams, **Thomas A. Campbell** (2013), "Additive Manufacturing (AM) and Nanotechnology: Promises and Challenges," *Rapid Prototyping Journal*, 19 (5), 353-364 **– 2014 Outstanding Paper, as selected by journal's editorial team.**
7. Olga S. Ivanova, Kristen A. Zimmermann, James R. Tuggle, **Thomas A. Campbell,** (2013) "Synthesis of Non-Spherical CdSe Nanocrystals," *Journal of Nanoparticle Research*, 15, 1382-1390.
8. Connor M. McNulty, Neyla Arnas, **Thomas A. Campbell** (2012), "Toward the Printed World: Additive Manufacturing and Implications for National Security," Ft. McNair, DC: Center for Technology and National Security Policy, *Defense Horizon 73,* September 2012.
9. Jon Whitney, Saugata Sarkar, Jianfei Zhang, Harry Dorn, Christopher Rylander, Dave Geohegan, **Thomas A. Campbell**, Thao Do, Taylor Young, Mary Kyle Manson, and Marissa Nichole Rylander (2011), "Single walled carbon nanohorns as photothermal cancer agents," *Lasers in Surgery and Medicine*, 43 (1), 43-51.
10. Shu, Chun-Ying; Zhang, Jianfei; Ge, Jiechao; Sim, Jae; Burke, Brian; Williams, Keith; Rylander, Nichole; **Campbell, Tom**; Puretzky, Alexander; Rouleau, Christopher; Geohegan, David; More, Karren; Esker, Alan; Gibson, Harry; Dorn, Harry (2010), "A Facile High-Speed Vibration Milling Method to Water-Disperse Single-Walled Carbon Nanohorns," *Chemistry of Materials*, 22, 347-351.
11. **Campbell, TA** (2009), "Measuring the Nano-World," *Nano Today*, 4, 380-381.
12. "Interagency working group on manufacturing research and development – instrumentation, metrology, and standards for nanomanufacturing," (October 17-19, 2006), *National Nanotechnology Initiative—Special Publication*; Sponsors: NIST, US Department of Commerce, NSF, Office of Naval Research, editorial contributor.
13. **Campbell,TA**; Schweizer,M; Dold,P; Cröll,A; Benz,KW (2001): Float zone growth and characterization of $Ge_{1-x}Si_x$ ($x \leq 10$ at%) single crystals. *J. Crystal Growth*, 226, 231-239.
14. **Campbell,TA**; Koster,JN (1999): Growth rate effects during indium-antimony crystal growth. *Crystal Research & Technology*, 34 (3), 275-283.
15. **Campbell,TA**; Koster,JN (1998): Compositional effects on solidification of congruently melting InSb. *Crystal Research & Technology*, 33 (5), 717-732.
16. **Campbell,TA**; Koster,JN (1998): Interface dynamics during indium antimonide crystal growth. *Crystal Research & Technology*, 33 (5), 707-716.
17. **Campbell,TA**; Koster,JN (1997): *In situ* visualization of off-stoichiometric equilibrium crystal growth within indium antimonide: antimony-rich composition. *J. Crystal Growth*,

174, 238-244.

18. **Campbell,TA**; Koster,JN (1997): *In situ* visualization of constitutional supercooling within a Bridgman-Stockbarger system. *J. Crystal Growth*, 171, 1-11.
19. **Campbell,TA**; Koster,JN (1995): A novel vertical Bridgman-Stockbarger crystal growth system with visualization capability. *Measurement Science & Technology*, 6 (5), 472-476.
20. **Campbell,TA**; Koster,JN (1995): Radioscopic visualization of indium antimonide growth by the vertical Bridgman-Stockbarger technique. *J. Crystal Growth*, 147, 408-410.
21. **Campbell,TA**; Koster,JN (1995): Modeling of liquid encapsulated gallium melts. *Acta Astronautica*, 35 (12), 805-812.
22. **Campbell,TA**; Koster,JN (1994): Visualization of liquid-solid interface morphologies in gallium subject to natural convection. *J. Crystal Growth*, 140, 414-425.

CONFERENCE PROCEEDINGS & OTHER PUBLICATIONS (not including proprietary and classified reports)

1. **Thomas A. Campbell** (August 20, 2025), Nationally Coordinated Innovation: America's Answer to China, Inc., Fellows Insights, News and Updates, Council on Competitiveness.
2. **Thomas A. Campbell,** John Stibal (August 28, 2023), Innovation Ecosystems are Critical to National Security and the Economy, LEAP Manufacturing.
3. Sterling Sawaya, Taner Kuru, **Thomas A. Campbell**, (January 5, 2022) The Potential for Dual-Use of Protein-Folding Prediction, *Freedom From Fear (F3) Magazine*, UNICRI (United Nations Interregional Crime & Justice Research Institute).
4. Karen Silverman, **Thomas A. Campbell**, (December 22, 2021) Into the Metaverse: Technology, Legal Implications & Actions, *The AI Journal*.
5. Karen Silverman, **Thomas A. Campbell**, (August 24, 2021) The knotty problem of applying real-world laws to VR and AR, World Economic Forum.
6. Lee Schlenker, **Thomas A. Campbell** (January 22, 2021), Embedded Finances, Medium.
7. **Thomas A. Campbell,** Damien Weldon (December 28, 2020), How Biden-Harris will shift the paradigm in US science and technology policy, Silicon Republic.
8. **Tom Campbell,** Jon Fetzer, Andrew Hyde, Erin Kenneally, Geoff Odlum, (December 2, 2020), "Pacing Policy Challenges and Implications within the Biden Administration," letter to key FutureGrasp contacts within the incoming Biden-Harris administration.
9. Lee Schlenker, **Thomas A. Campbell,** Jon Fetzer, (July 13, 2020), Artificial Intelligence for Business During and Post-COVID19, Business Analytics Institute & FutureGrasp Blog
10. **Tom Campbell,** Jon Fetzer, Andrew Hyde, Erin Kenneally, Geoff Odlum, (March 31, 2020), Globalization following Coronavirus: Business as Usual or a New Normal?, FutureGrasp Foundry.
11. **Tom Campbell,** Jon Fetzer, Andrew Hyde, Erin Kenneally, Geoff Odlum, (March 6, 2020), Geopolitical Implications of Coronavirus: Preliminary Insights, FutureGrasp Foundry.

12. **Tom Campbell,** Jon Fetzer, Andrew Hyde, Erin Kenneally, Geoff Odlum, (February 27, 2020), Coronavirus: Corporate Implications and Recommendations, FutureGrasp Foundry,
13. **Thomas A. Campbell** (October 7, 2019), Toward Digital Power over States, New Atlanticist, Atlantic Council.
14. **Thomas A. Campbell** & Jon Fetzer (August 30, 2019), Artificial Intelligence: State Initiatives and C-Suite Implications, Emerj Blog.
15. **Tom Campbell** (April 4, 2019), AI National Plans: Their Necessity and Core Components, FutureGrasp Blog,
16. **T. Campbell,** N. Wadstrom, (January 25, 2019), Powering Autonomous Dreams, BootstrapLabs Blog.
17. **T. Campbell,** N. Wadstrom, (November 26, 2018), Banishing the Darkness with Artificial Intelligence, BootstrapLabs Blog.
18. **T. Campbell** (September 7, 2018), Digital Twins and Digital Doubles: Populating our Virtual Worlds, FutureGrasp Blog.
19. **T. Campbell** (August 10, 2018), Terminator Conundrum: Perhaps a Middle Ground?, FutureGrasp Blog.
20. **T. Campbell** (July 20, 2018), Opportunities and Challenges from Artificial Intelligence for Law Enforcement, FutureGrasp Blog.
21. **T. Campbell** (June 19, 2018), Why Stop at Voice?, FutureGrasp Blog.
22. **T. Campbell**, (May 4, 2018), Quantum Supremacy is Near, FutureGrasp Blog,
23. **T. Campbell,** R. Meagley (February 2, 2018), "Next-Generation Compute Architectures Enabling Artificial Intelligence" Part I, Part II," FutureGrasp Blog.
24. **T. Campbell,** M. Wolfe, (January 9, 2018), Identifying the Next Big Thing: Qual vs. Quant, FutureGrasp Blog,
25. **T. Campbell,** (December 4, 2017), The Need For Artificial Intelligence: Increasing Global And Human Complexity, FutureGrasp Blog.
26. **T. Campbell**, (November 5, 2017), Kardashev Scale Analogy: Long-Term Thinking about Artificial Intelligence, FutureGrasp Blog.
27. K. Schraml, M. Kaniber, J. Bartl, G. Glashagen, A. Regler, **T. Campbell,** J.J. Finley; Linear and Non-linear Response of Lithographically Defined Plasmonic Nanoantennas, Proc. SPIE 9371, Photonic and Phononic Properties of Engineered Nanostructures V, 93711D (February 27, 2015).
28. Michael Kaniber, Konrad Schraml, Johannes Bartl, Glenn Glashagen, Armin Regler; **Tom Campbell;** Jonathan J. Finley (2015), "Non-linear optical effects in plasmonic gold nanoantennas," SPIE Photonics West-Conference 2015, Session on Novel Phenomena in Plasmonic Structures; [9371-45] San Francisco, California; oral presentation.
29. **Thomas A. Campbell,** Skylar Tibbits, Banning Garrett (November 2014), The Programmable World, *Scientific American.*

30. **Thomas A. Campbell** (2014), Moore's Law 2.0, Future Source, Atlantic Council,
31. Jonathan Finley, **Tom Campbell**, Olga Ivanova, Amelia Elliott, Christopher B. Williams, Michael Kaniber, Konrad Schraml, (June 16-18, 2014) "7.04 Hybrid Photonic Nanomaterials," IGSSE Forum, Technische Universität München, Garching, Germany, poster.
32. **Thomas A. Campbell** (2014), Beyond 3D Printing: Programming the Material World, The New Atlanticist, Atlantic Council.
33. **Thomas A. Campbell,** Skylar Tibbits, Banning Garrett (2014), "The Next Wave: 4D Printing - Programming the Material World," Brent Scowcroft Center on International Security, Atlantic Council, http://www.atlanticcouncil.org/images/publications/The_Next_Wave_4D_Printing_Programming_the_Material_World.pdf; reported by *Bloomberg Businessweek* - http://www.businessweek.com/articles/2014-05-27/real-life-transformers-bring-opportunity-and-danger-new-report-says and *International Relations and Security Network* - *http://www.isn.ethz.ch/Digital-Library/Publications/Detail/?lng=en&id=182356*
34. **Thomas A. Campbell** (April 14, 2014), "Beyond Today's Internet," Future Source, Atlantic Council, http://www.atlanticcouncil.org/blogs/futuresource/beyond-today-s-internet
35. **Thomas A. Campbell,** William J. Cass (2013), 3-D Printing Will Be a Counterfeiter's Best Friend—Why we need to rethink intellectual property for the era of additive manufacturing, *Scientific American*,
36. "Envisioning 2030: US Strategy for the Coming Technology Revolution," (2013), Strategic Foresight Initiative, Brent Scowcroft Center on International Security, Atlantic Council, contributing author and reviewer.
37. The Future of Unmanned Vehicle Systems in Virginia—2014, (2013), Commonwealth of Virginia, Virginia Department of Aviation, contributing author and reviewer.
38. Ivan Hanzlicek, Chunxiang Huang, Máté Péntek, Stefan Kollmannsberger, **Thomas Campbell,** (2013), "Computational Modeling of Stereolithography," CoMe-Software Lab 2013, Technical University of Munich (TUM).
39. Peter Haynes, **Thomas A. Campbell** (2013), Hacking the Internet of Everything, *Scientific American.*
40. K. Schraml, M. Spiegl, M. Kammerlocher, O. Ivanova, G. Bracher, A. Elliott, B. Mayer, **T. Campbell,** M. Kaniber, J.J. Finley (June 22, 2013), "7.04 Hybrid Photonic Nanomaterials," IGSSE Research Forum 2013, Raitenhaslach Monastery, Burghausen, Germany, poster.
41. Olga S. Ivanova, **Thomas A. Campbell** (2013), "Fluorescent Microspheres as Tags for Anti-Counterfeiting of Textiles," TechConnect 2013, Washington, D.C., poster and technical proceedings.
42. Roop Mahajan, Jeff Reed, Naren Ramakrishnan, Rolf Mueller, Chris Williams, **Thomas Campbell**, (November 9-15, 2012), "Cultivating Emerging and Disruptive Technologies," ASME 2012 International Mechanical Engineering Congress & Exposition, Houston, Texas, presentation and technical proceedings (refereed).

43. Pegah Ghanbari, Sayan Naha, **Tom Campbell** (November 2, 2012), "Application of Carbonaceous Nanoparticles for Anti-Counterfeiting Industry," Interdisciplinary Research Symposium, Virginia Tech, Blacksburg, VA, poster.
44. A.M. Elliott, O.S. Ivanova, C.B. Williams, **T.A. Campbell,** (August 5-9, 2012), "An investigation of the effects of quantum dot nanoparticles on photopolymer resin for use in polyjet direct 3D printing," SFF Symposium, Austin, Texas, presentation and technical proceedings (refereed).
45. K. Schraml, M. Kammerlocher, O. Ivanova, B. Mayer, G. Bracher, A. Laucht, B. Widemann, M. Kaniber, E. Margapoti, **T. Campbell,** J. Finley (July 4-6, 2012), "7.04 – Hybrid Photonic Nanostructures," IGSSE Forum 2012—Careers in the 21st Century, Raitenhaslach Monastery, Burghausen, Germany, poster.
46. O.S. Ivanova, A. Elliott, **T.A. Campbell,** C.B. Williams (June 26, 2012), "Polymer nanocomposites for additive manufacturing," World Polymer Congress - MACRO2012, Blacksburg, VA, presentation and technical proceedings (refereed).
47. O.S. Ivanova, A. Elliott, **T.A. Campbell**, C.B. Williams (June 18-21, 2012), Additive Manufacturing (AM) of Quantum Dot Nano-Inks, TechConnect 2012, poster and conference proceedings. (refereed),
48. O.S. Ivanova, K.A. Zimmerman, **T.A. Campbell**, "Synthesis of Non-Spherical CdSe Quantum Dots," *Nanotech 2012*, Vol. 1, 457-460. (refereed)
49. O.S. Ivanova, A. Elliott, **T.A. Campbell,** C.B. Williams. (2012). "Additive Manufacturing with Nano-Inks." *Nanotech 2012*, Vol. 2, 275-278. (refereed)
50. **Campbell, T.A.** (2012), "Additive Manufacturing as a Disruptive Technology—Implications of Three-Dimensional Printing," white paper, written at the request of the New America Foundation.
51. Williams, C.B.; **Campbell, T.A.** (2012) "Additive Manufacturing at Virginia Tech," ICTAS Spring 2012 Newsletter.
52. **Campbell, T.A.** (March 8-9, 2012); "Metrology for Additive Manufacturing—Opportunities in a Rapidly Emerging Technology," Metromeet 2012; 8th International Conference on Industrial Dimensional Metrology; Bilbao, Spain; conference proceedings—*awarded "Best Paper" for conference.*
53. **Thomas A. Campbell**, Christopher B. Williams, Olga S. Ivanova, Banning Garrett (2011), Could 3D Printing Change the World? Technologies, Potential and Implications of Additive Manufacturing, Report No. 1; Strategic Foresight Initiative; Atlantic Council; report was picked up by >20 blogs and websites, including www.forbes.com, as a "Must Read".
54. Olga S. Ivanova, Christopher B. Williams, **Thomas A. Campbell** (August 8-10, 2011), "Additive Manufacturing and Nanotechnology: Promises and Challenges;" *The 22nd International SFF Symposium-An Additive Manufacturing Conference;* Austin, Texas; conference proceedings, pp. 733-749. (refereed)
55. Whitney, J.; Dorn, H.; Rylander, C.; **Campbell, T.**; Geohegan, D.; Rylander, M.N.; (2010) "Spatiotemporal Temperature and Cell Viability Measurement Analysis of Multi-Walled

Carbon Nanotubes and Single Walled Nanohorns as Photoabsorbers for Use in Tumor Photothermal Therapy," ICTAS Research Day, poster – *awarded 2nd Prize for technical and presentation content among 75 judged posters.*

56. Whitney, J.; Dorn, H.; Rylander, C.; **Campbell, T.**; Geohegan, D.; Rylander, M.N. (June 16-19, 2010), "Spatiotemporal temperature and cell viability measurement following laser therapy in combination with carbon nanohorns," Proc. of the ASME 2010 Summer Bioengineering Conference, Naples, Florida. (refereed)
57. Sarkar, S., Lutkus, A., Mahaney, J., Dorn, H., **Campbell, T.**, Geohegan, D., and Rylander, M.N. (October 15-16, 2009) "Effect of reactive oxygen species (ros) in water soluble carbon nanohorns during laser irradiation with different laser parameters," *The 6th Annual Via Research Recognition Day*, Edward Via Virginia College of Osteopathic Medicine (VCOM), VA, USA, poster.
58. **Campbell, T.,** Finkielstein, C. (2009), "Cancer Research at Virginia Tech—Understanding the Fundamentals of Cancer and Developing Appropriate Drugs," ICTAS Spring 2009 Newsletter.
59. Whitney, J., Sarkar, S., Sayan, N., Zhang, J., Lutkus, A., Mamaney, J., Dorn, H., **Campbell, T.**, Geohegan, D., and Rylander, M.N. (October 14-15, 2009) "Single Walled Carbon Nanohorns as Near Infra-Red Photoabsorbers for Thermal Tumor Treatment," *A Humboldt Kolleg on Nano-Bio conference,* The Hotel Roanoke and Conference Center, Roanoke, VA, USA, poster.
60. Whitney, J.; Zhang, J.; Dorn, H.; **Campbell, T.A.**; Naha, S.; Rylander, M.N. (June 17-21, 2009), "Carbon Nanotube Peapod-Mediated Laser Cancer Therapy," Proceedings of the ASME 2009 Summer Bioengineering Conference (SBC2009), Resort at Squaw Creek, Lake Tahoe, CA.; presentation and technical proceedings (refereed).
61. Sarkar, S., Lutkus, A., Mahaney, J., Dorn, H., **Campbell, T.**, Geohegan, D., and Rylander, M.N., (June 17-21, 2009) "Carbon nanohorns as photochemical and photothermal agents," *Proceedings of the ASME Summer Bioengineering Conference (SBC2009),* Resort at Squaw Creek, Lake Tahoe, CA, USA: ASME; presentation and technical proceedings (refereed).
62. **Campbell, T.A.**, Allocca, C.M. (June 9-11, 2009), "A needs-based assessment of measurements and their potential solutions for nanotechnology / environmental, health & safety," International Conference on the Environmental Implications and Applications of Nanotechnology, University of Massachusetts at Amherst, poster presentation.
63. **Campbell, T.A.**; Allocca, C.M. (May 6, 2009), "Assessment: Nano-EHS," NIST internal publication (refereed).
64. Allocca, C.M; **Campbell, T.A.** (October 7-9, 2008), "A Needs-based Assessment of Measurements for Nanotechnology / Environmental Health and Safety," International Environmental Nanotechnology Conference, Chicago, IL, poster and proceedings article (refereed).
65. Sarkar, S., Lutkus, A., Mahaney, J., Dorn, H., **Campbell, T.**, Geohegan, D., and Rylander, M.N. (October 3, 2008) "Measurement of reactive oxygen species in water soluble carbon nanohorn," *The 5th Annual Via Research Recognition Day,* Edward Via Virginia College of

Osteopathic Medicine (VCOM), VA, USA, poster.

66. Allocca, C.M; **Campbell, T.A.** (June 1-5, 2008), "A Needs-based Assessment of Measurements for Nanotechnology / Environmental Health and Safety," NSTI 2008, Boston, MA, presentation and technical proceedings (refereed).
67. **Campbell, T.A.**; Ahrenkiel, R.; Lehman, J.; Hurst, K.; Dillon, A. (August 14-16, 2007) "Electronic Nanometrology of Bulk Carbon Nanotubes," NIST Workshop on Materials Characterization for Nanoscale Reliability, Boulder, CO, poster.
68. **Campbell, T.A.**; Manelski, D.; Thomas, E.; Prunier, V.; Bateman, C. (August 4-9, 2002) "Does calcium fluoride have a preferred growth orientation?," Fourteenth American Conference on Crystal Growth and Epitaxy (ACCGE-14), Seattle, WA, poster.
69. Dold, P.; Schweizer, M.; Cröll, A.; **Campbell, T.A.**; Boschert, S.; Benz, K.W. (July 30 – August 4, 2001) "Float Zone Growth of Alloy Semiconductor Crystals: Influence of Solutocapillary Convection," Thirteenth International Conference on Crystal Growth/Eleventh International Conference on Vapor Growth & Epitaxy (ICCG-13/ICVGE-11), Kyoto, Japan, poster (refereed).
70. **Campbell, T.A.**; Pool, R.E.; Koster, J.N. (January 10-13, 1994) "Melting and solidification of a liquid metal at a vertical wall". 32nd Aerospace Sciences Meeting & Exhibit, Reno, NV, AIAA 94-0792, 1-4. (refereed)
71. Koster, J.N.; Prakash, A.; **Campbell, T.A.**; Pline, A. (November 8-13, 1992) "Analysis of convection in immiscible liquid layers with novel Particle Tracking Velocimetry". ASME Winter Annual Meeting, AMD - Vol 154, Fluid Mechanics Phenomena in Microgravity, Ed. D.A. Siginer, M.M. Weislogel, Book No. G00766-1992, 95-103. (refereed)

PRESENTATIONS (*=Invited Talks, **=Keynote Talks; proprietary and classified talks not included)

1. **Thomas A. Campbell,** P. Dorhout, M. Hulver, P. Isaac, M. Ruzzene (June 9, 2026*), "40TH ANNIVERSARY COMPETITIVENESS RECOMMENDATIONS (E.G., AMERICAN INNOVATION AND MANUFACTURING (AIM) ZONES)," Technology Leadership & Strategy Initiative, Lockheed Martin, Fort Worth, TX, panel discussant.
2. **Thomas A. Campbell,** (April 27, 2026*), "Energy Storage at Warfighting Speed: Resilience, Standards, and National Coordination," Power & Propulsion Community of Interest (COI), Lockheed Martin, virtual presentation.
3. **Thomas A. Campbell**, Eric Shields, Chad Shaffer, Deanna Ahmed (September 17, 2025*), "Mission Critical: U.S. Manufacturing of Next-Generation Energy Storage Systems for the U.S. Department of Defense," House Manufacturing Caucus event, Washington, D.C., panel moderator.
4. **Thomas A. Campbell** (September 2, 2025*), "Mission Critical: National Energy Storage Systems (NESS) Program," Federal Consortium for Advanced Batteries (FCAB), virtual presentation.
5. **Thomas A. Campbell** (April 23, 2025**); First Look & Open House: BEACONS Prototype Facility; University of Texas at Dallas; Richardson, Texas; opening keynote.

6. **Thomas A. Campbell**, Lital Mehr, James Trevey, Joseph Pancrazio, Adam Reed, (March 9, 2025*), "Addressing National Security, One Battery at a Time," Capital Factory, SXSW 2025, Austin, Texas, panel moderator.
7. **Thomas A. Campbell,** Adam Reed, (March 6, 2025), "Combating the Challenges of Sourcing Power," AUI Podcast, https://beyondthebreakthrough.podbean.com/
8. **Thomas A. Campbell**, "BEACONS," (November 19, 2024*), Energy Storage Systems for UAVs (Drones), Dayton, Ohio.
9. **Thomas A. Campbell,** "Securing Critical Mineral Supplies: A National Imperative," (November 14, 2024**), Utah Mining Association 109th Annual Meeting, Salt Lake City, Utah.
10. **Thomas A. Campbell,** Vivek Furtado, "Confronting Challenges in Battery Tooling and Equipment," (April 16, 2024*), panel moderator, "Challenges and Advances in Tooling and Equipment for Battery Manufacturing," University of Texas at Dallas, Richardson, Texas.
11. **Thomas A. Campbell,** Emily Leproust, Alexander Titus, Genya Dana, Risk vs Reward: Removing Barriers to Biotech Breakthroughs, (March 9, 2024*), panel moderator, SXSW 2024, Austin, Texas.
12. **Thomas A. Campbell,** AI and the Future of National Security, Summit on Modern Conflict and Emerging Threats, (May 4-5, 2023*), Vanderbilt University, Nashville, Tennessee.
13. **Thomas A. Campbell,** "Future of Disruptive Technologies: Critical Supply Chains," (March 27-28, 2023*), National Commission on Innovation & Competitiveness Frontiers, Phase 2 Launch Summit, invited talk and panel moderator, Council on Competitiveness, Davis, California.
14. Bertrand de la Chappelle, Eugene Volokh, Robert Currie, Mark McCarthy, **Thomas A. Campbell** (June 9, 2022*), Challenges to Law, Jurisdiction, and Governance in an Immersive World, Our Immersive Digital Future: How Extended Reality May Affect International Relations, panelist.
15. **Thomas A. Campbell** (April 11, 2022*), United World College, talk given on my career and entrepreneurship to cohort of high school students.
16. Damien Weldon, **Thomas A. Campbell,** Karen E. Silverman (December 10, 2021*), Gremlins and Guardrails: What's Next for the Metaverse, webinar, invited panelist.
17. **Thomas A. Campbell,** (November 23, 2020*), Uncovering the AI-narchy cyberspace disorder and new technologies, Third Annual Conference of the Centre on Cybersecurity promoted by ISPI and Leonardo, ISPI-Italian Institute for International Political Studies, Italian Ministry of Foreign Affairs and International Cooperation, Leonardo, webinar, invited panelist.
18. **Thomas A. Campbell,** (September 29, 2020*), The MITRE Corporation, "AI and National Security Landscape", panelist for "State Competitor Developments"
19. **Thomas A. Campbell,** (June 24, 2020*), Professionalization Session, USC Security and Political Economy (SPEC) Lab, invited speaker

20. **Thomas A. Campbell,** (June 22, 2020), **"**Diplomacy Turmoil: Artificial Intelligence Opportunities," AI has a Key Role in Driving the New Normal, SwissCognitive, closing keynote
21. Launch of the United Nations Secretary General's Road Map for Digital Cooperation (June 11-15, 2020), webinar, invited participant, FutureGrasp comments made at 3:16:16
22. **Thomas A. Campbell,** (May 20, 2020), "COVID Planet Reset- Chaos or Peace?," YPO webinar, invited speaker
23. **Thomas A. Campbell,** (May 8, 2020), "New Rules, New Games: The Post Covid-19 Global Power Play," YPO webinar, invited speaker
24. **Thomas A. Campbell,** (April 24, 2020), Geopolitics in the Pandemic Era, University of Southern California webinar, invited panel speaker
25. **Thomas A. Campbell,** (April 7, 2020) Developing and Deploying at Scale Disruptive Technologies, The National Commission on Innovation and Competitiveness Frontiers, Council on Competitiveness, online weekly forum, invited speaker.
26. **Thomas A. Campbell,** (April 1, 2020) Energy Grid: Keeping the Lights On with Artificial Intelligence," AI Capital Webinar
27. **Thomas A. Campbell,** (March 31, 2020), Boardroom Series Orlando, FL, invited talk
28. **Thomas A. Campbell** (September 17, 2019*), "Proposals to Governments," International Cooperation on AI; Paris, France; panelist.
29. **Thomas A. Campbell** (August 20, 2019**), "Artificial Intelligence: An Overview of State Initiatives," Human Capital Management Think Tank, Quarterly Meeting, Sonoma, CA
30. **Thomas A. Campbell** (August 7, 2019*), "Artificial Intelligence: An Overview of State Initiatives," US State Department, Washington, D.C.
31. **Thomas A. Campbell** (August 6, 2019*), "Artificial Intelligence: An Overview of State Initiatives," US Joint Artificial Intelligence Center (JAIC), Washington, D.C.
32. **Thomas A. Campbell** (August 6, 2019*), "Artificial Intelligence: An Overview of State Initiatives," US Department of Energy, AI Group, Washington, D.C.
33. **Thomas A. Campbell** (August 5, 2019*), "Artificial Intelligence: An Overview of State Initiatives," Center for Security and Emerging Technology-CSET, Washington, D.C.
34. **Thomas A. Campbell** (April 18, 2019**), AI National Plans, State Funding & Geopolitical Implications, BootstrapLabs Applied AI Conference 2019, San Francisco, CA.
35. **Thomas A. Campbell** (September 20, 2018*), "Assessing Strategic Effects of Artificial Intelligence" workshop, Lawrence Livermore National Laboratory (LLNL), Livermore, CA, panelist.
36. **Thomas A. Campbell** (July 12, 2018**), "Looking into the Future…", 1st INTERPOL – UNICRI Global Meeting on the Opportunities and Risks of Artificial Intelligence and Robotics for Law, Singapore.
37. **Thomas A. Campbell** (June 12, 2018*), "Strategic Technologies and their Global

Implications," International Institute for Strategic Studies (IISS), Washington, DC.

38. **Thomas A. Campbell,** (April 12, 2018**), "The Death of Moore's Law—and the Birth of New Semiconductor Industries and AI," BootstrapLabs Applied Artificial Intelligence, San Francisco, CA, keynote and panel moderator.
39. **Thomas A. Campbell,** (December 6, 2017*), "Benefits and Risks of Future Forecasting Methodologies," US Army Futures Forum: Structuring Our Futures Thinking, Washington, DC, panel participant.
40. **Thomas A. Campbell,** (November 30, 2017**), "Applied AI Workshop: The Hard Things about Deploying and Scaling AI," BootstrapLabs Applied AI Insiders Workshop, San Francisco, CA.
41. **Thomas A. Campbell** (November 8, 2017*), Drones are Flying High, but what about their Valuations?, DC Finance, New York City, NY, panel participant.
42. **Thomas A. Campbell** (November 7, 2017*), "Security and Technology Trends," Thomson Reuters CP Live Expert Talk, New York City, NY.
43. **Thomas A. Campbell** (September 26, 2017), "Exploring Legal, Ethical and Policy Implications of Artificial Intelligence," World Bank Group – Law, Justice and Development, panel participant.
44. **Thomas A. Campbell** (June 14, 2017*), "Technology: A Fundamental Agent of Change," Trade Association Partners Group, Washington, D.C.
45. **Thomas A. Campbell** (June 12, 2017*), "Technology: A Fundamental Agent of Change," Technology Leadership & Strategy Initiative (TLSI) quarterly meeting, US Council on Competitiveness, Washington, D.C.
46. **Thomas A. Campbell** (November 4, 2016**), "Tech Trends – Toward *Human X.0*," US Council on Competitiveness, Washington, D.C.
47. **Thomas A. Campbell** (October 26, 2016**), "Tech Trends – Toward *Human X.0*," Argonne National Laboratory, Chicago, IL.
48. **Thomas A. Campbell** (August 2, 2016**), "Tech Trends – Toward *Human X.0*," DODIIS Worldwide 2016, Atlanta, GA.
49. **Thomas A. Campbell** (April 26, 2016*), "Tech Trends – Next 20+ Years," US Technology Leadership Council, Alexandria, VA.
50. **Thomas A. Campbell** (April 14, 2016*), "Tech Trends – Next 20+ Years," AFCEA Group, Herndon, VA.
51. **Thomas A. Campbell** (October 27, 2015**), "Tech Trends 2035," Thomson Reuters, Partnership Showcase 2015, New York City, New York.
52. **Thomas A. Campbell** (January 21, 2015), "NSC Briefing on Disruptive Technologies," Transborder Security Directorate, ***National Security Council, Eisenhower Executive Office Building, White House,*** Washington, D.C.; panel participant at invitation of the Atlantic Council.

53. **Thomas A. Campbell** (January 14, 2015), "3D Printing: Healthcare & Manufacturing," Syneidesis Winter 2015 – The Winter of Shifting Alliances, The Syneidesis Group, The Metropolitan Club, New York City, NY, panel discussion participant.
54. **Thomas A. Campbell** (October 9, 2014*), "Briefing on Disruptive Technologies," ***National Security Council, Eisenhower Executive Office Building, White House,*** Washington, D.C.; panel participant at invitation of the Atlantic Council.
55. **Thomas A. Campbell** (May 28, 2014*), "Black Swans and Emerging Disruptive Technologies," Implications of Technology Change: Emerging Disruptive Technology, S&T Conference, ***British Embassy,*** Washington, D.C., talk and panel participation.
56. **Thomas A. Campbell** (April 8, 2014), "How Might Additive Manufacturing Impact the Sea Services?," Sea Air Space Expo, Gaylord Convention Center, National Harbor, MD; presenter and panel moderator; on the panel were a Navy 1-star admiral and a Coast Guard rear admiral.
57. Anil Vullikanti, Dhruv Batra, Devi Parikh, Naren Ramakrishnan, **Thomas A. Campbell** (April 4, 2014), "Big Data Forecasting," ICTAS Black Swan Seminar, Virginia Tech, Blacksburg, VA, panel moderator.
58. **Thomas A. Campbell** (February 19, 2014**), "Leapfrog Technologies & Opportunities in Agriculture," Partnering for Innovation (part of USAID's Feed the Future), ***84 participants from 14 countries***, webinar.
59. **Thomas A. Campbell** (February 6, 2014*), "Toward the Printed World—Opportunities in Additive Manufacturing (3D Printing)," Food & Drug Administration (FDA), Silver Spring, MD.
60. Jeff Reed, Tom Martin, **Thomas A. Campbell** (January 31, 2014), "Connect Anywhere, Anytime with Anything [Internet of Things]," ICTAS Black Swan Seminar, Virginia Tech, Blacksburg, VA, panel moderator.
61. **Thomas A. Campbell** (December 10-11, 2013**), "Societal Implications of Additive Manufacturing," Additive Manufacturing for the Government, Washington, D.C.
62. **Thomas A. Campbell** (October 25, 2013), "3D Printing with Nanomaterials—New Opportunities for Design," DARPA-ISAT Rethinking CAD Workshop, Arlington, VA.
63. **Thomas A. Campbell** (October 23, 2013*), Panel on Emerging Technologies Series, Council on Foreign Relations, New York City, New York.
64. **Thomas A. Campbell** (October 10, 2013*), "Implications of Disruptive Technologies," Strategic Foresight Initiative, Atlantic Council, Washington, D.C.; attendees included former president of Serbia, former prime minister of Italy, former minister of foreign affairs of Malta, and others; panel speaker.
65. **Thomas A. Campbell** (July 16, 2013), Panel on Advanced Manufacturing and US Competitiveness, 2013 High Tech Roundtable, US International Trade Commission, Washington, D.C.
66. **Thomas A. Campbell** (July 12, 2013*), "Toward the Printed World—Opportunities in

Additive Manufacturing (3D Printing)," Fixed Income Forum, Institutional Investors, San Diego, CA.

67. **Thomas A. Campbell** (June 7, 2013*), "Toward the Printed World—Opportunities in Additive Manufacturing (3D Printing)," Singapore Economic Development Board, Arlington, VA.
68. **Thomas A. Campbell,** (March 27-28, 2013*), "Toward the Printed World—an Overview of Additive Manufacturing (3D Printing)," NeXTech Wargame #4, sponsored by Office of Secretary of Defense and US Naval Academy, Annapolis, MD.
69. **Thomas A. Campbell**, (February 20, 2013*), "Additive Manufacturing (3D Printing)—LENS, the Laboratory for Engineered NanoSystems," presented to Dr. Lawrence Schuette, director of research, Office of Naval Research, Arlington, VA.
70. **Thomas A. Campbell**, (February 19, 2013*), "Additive Manufacturing (3D Printing)—overview and trade implications," U.S. International Trade Commission, Washington, D.C.
71. **Campbell, T.A.** (December 3, 2012*), "Toward the Printed World: Health Care and Legal Impacts to National Security and Future Trends," *Additive Manufacturing (AM) Workshop: US National Defense and the 3D Printing Revolution*, Atlantic Council, Washington, D.C.
72. **Campbell, T.A.** (October 25, 2012*), Panelist for PhD Final Seminar, Technical University of Munich Graduate School, Munich, Germany; *all in German language.*
73. **Campbell, T.A.** (October 24, 2012*), "Additive Manufacturing—Potential for Numerical Simulation Research," Technical University of Munich; Munich, Germany.
74. **Campbell, T.A.** (October 16, 2012*), "Additive Manufacturing—Applications, Challenges, and the Future," Central Intelligence Agency (CIA), Washington, D.C., seminar recorded and broadcast live to all 17 intelligence community agencies.
75. **Campbell, T.A.** (October 16, 2012*), "Additive Manufacturing—Materials," Atlantic Council, Washington, D.C.
76. **Campbell, T.A.** (September 28, 2012*), "Additive Manufacturing at Virginia Tech—Nanocomposites Research," NASA Marshall Space Flight Center, Huntsville, Alabama.
77. Williams, C.B. and **Campbell, T.A.** (September 21, 2012*), "Additive Manufacturing: Implications on Research and Manufacturing," Black Swan seminar series, Institute for Critical Technology and Applied Science (ICTAS), Virginia Tech.
78. **Campbell, T.A.** (June 21, 2012*) "Laboratory for Engineered Nano-Systems (LENS)," Condensed Matter and Materials Division, Lawrence Livermore National Laboratory (LLNL), Livermore, CA.
79. **Campbell, T.A.** (April 13, 2012*) "ICTAS Associate Director for Outreach—Activities," ICTAS Staff Meeting, Blacksburg, VA.
80. **Campbell, T.A.** (April 11, 2012) "ETC and DoD Labs Meeting," VTRC-Arlington, Arlington, VA.
81. **Campbell, T.A.** (March 8-9, 2012**) "Metrology for Additive Manufacturing—Opportunities in a Rapidly Emerging Technology," Metromeet 2012; 8th International

Conference on Industrial Dimensional Metrology; Bilbao, Spain.

82. **Campbell, T.A.**; Williams, C.B. (January 30, 2012*), "Additive Manufacturing as a Disruptive Technology," US Department of State, Washington, D.C.; **invited presentation from the Science and Technology Adviser to the Secretary of State, Dr. E. William Colglazier.**
83. **Campbell, T.A.** (January 11, 2012*), "Additive Manufacturing Research at Virginia Tech-Nanotechnology and Metrology Opportunities," National Institute of Standards and Technology (NIST), Gaithersburg, MD.
84. **Campbell, T.A.** (January 10, 2012), "Kolleg Committee Update," American Friends of the Alexander von Humboldt Foundation, Board of Directors meeting.
85. **Campbell, T.A.** (November 16, 2011*); "Nanomaterials and 3D Printing – a New Paradigm for Nanocomposites," Workshop on Functional Hybrid Nanosystems; TUM Institute of Advanced Study; Garching, Germany.
86. **Campbell, T.A.** (November 4, 2011*), Interdisciplinary Research (IDR) Honor Society-Iota Delta Rho, Virginia Tech, panelist during interactive workshop.
87. **Campbell, T.A.**; Williams, C.B. (October 12, 2011*), "Additive Manufacturing (3D Printing) – Transformative Technology for Development and Emergency Support," Pentagon (inner courtyard), Washington, D.C.
88. **Campbell, T.A.**; Williams, C.B. (October 5, 2011*), "Additive Manufacturing (3D Printing) – Transformative Technology for Development and Emergency Support," TIDES, National Defense University, Fort McNair, Washington, D.C.
89. Williams, C.B.; **Campbell, T.A.** (August 19, 2011*), "Additive Manufacturing (3D Printing)—State of the Art, Potential, and Implications," National Defense University, Fort McNair, Washington, D.C.
90. **Campbell, T.A.** (July 18, 2011*), "Additive Manufacturing and Nanotechnology: A new breed of nanocomposites," Hewlett Packard, Fort Collins, Colorado.
91. Williams, C.B.; **Campbell, T.A.** (March 23, 2011*), "Additive Manufacturing (3D Printing)—State of the Art, Potential, and Implications," Atlantic Council, Washington, D.C.
92. **Campbell, T.A.** (February 24, 2011*), "ICTAS Overview," NVTC University Technology Exhibition, panel, McLean, VA.
93. **Campbell, T.A.** (May 24, 2011*), "Strategic Planning," American Friends of the Alexander von Humboldt Foundation Board of Directors Meeting, Washington, D.C.
94. **Campbell, T.A.** (January 10, 2011*), "Strategic Planning and Humboldt Kolleg," American Friends of the Alexander von Humboldt Foundation Board of Directors Meeting, Washington, D.C.
95. **Campbell, T.A.** (October 9, 2010*), "Strategic Planning and Humboldt Kolleg," American Friends of the Alexander von Humboldt Foundation Board of Directors Meeting, Berlin, Germany.
96. **Campbell, T.A.** (June 17, 2010**), "Printing opportunities with nanomaterials,"

International Graduate School of Science and Engineering (IGSSE) Forum, Technical University of Munich, Raitenhaslach Monastery, Burghausen, Germany.

97. **Campbell, T.A.** (March 31, 2010*), "Printing opportunities with nanomaterials," Hewlett-Packard (HP), Fort Collins, Colorado.

98. **Campbell, T.A.** (December 14, 2009*), "Nano-Bio Interfaces," Institute for Inhalation Biology, GSF-National Research Center for Environment and Health, Munich, Germany.

99. Allocca, C.M.; **Campbell, T.A.** (June 3, 2009*), "(PACRIM8-S22-004-2009) A Needs-based Assessment of Measurements for Nanotechnology / Environmental Health and Safety (Invited Speaker)," 8th Pacific Rim Conference on Ceramic and Glass Technology, Vancouver, British Columbia.

100. **Campbell, T.A.**; Allocca, C.M. (May 6 & 28, 2009**), "Nano-EHS and the United States Measurement System," webinar with the United States Measurement System (USMS) office of the National Institute of Standards and Technology (NIST).

101. **Campbell, T.A.**; Allocca, C.M. (June 17, 2008*), "Nanotechnology – Safety and Future Trends," NIST Safety Day, Gaithersburg, MD, **presentation to all of NIST (~5,000 employees in audience and via video conference).**

102. **Campbell, T.A.**; Allocca, C.M. (June 9-10, 2008**), A Needs-based Assessment of Measurement Needs for Nanotechnology / Environmental Health and Safety, Nano-EHS Workshop, Crystal City, VA.

103. **Campbell, T.A.**; Allocca, C.M (May 29, 2008*) "A Needs-based Assessment of Measurements for Nanotechnology / Environmental Health and Safety," Rice University, Houston, TX.

104. Zhang, J.; Ashraf-Khorassani, M.; Reid, J.; Rylander, N.; **Campbell, T.**; Dorn, H. (May 21, 2008), "The Synthesis and Characterization of Trimetallic Nitride Fullerene Nanopeapods," 213th Electrochemical Society (ECS) Meeting, Phoenix, AZ, presentation.

105. **Campbell, T.A.**; Allocca, C.M (April 6-9, 2008) "A Needs-Based Assessment of Nanotechnology / Environmental, Health and Safety," Nanomedicine Workshop, Wake Forest University, presentation.

106. Allocca, C.M; **Campbell, T.A.** (January 26-28, 2008) "Measurement Needs for Nanotechnology / Environmental, Health and Safety," IMI Engineered Fine and Nanoparticle Applications Conference, Orlando, FL, presentation.

107. Hurst, K.E.; Ahrenkiel, R.K.; **Campbell, T.**; Lehman, J.H. (October 16, 2007*), "A Novel Approach for Electronic Nanotechnology of Carbon Nanotubes," AVS 54th International Symposium, Session Nanometer-scale Science & Technology, Paper NS+MS-TuA4, presentation.

108. Lehman, J.L.; Street, L.; **Campbell, T.A.** (June 19-21, 2007*) "Nanometrology of carbon nanotubes using novel and traditional nanotools," EuroNanoForum 2007, Düsseldorf, Germany.

109. **Campbell, T.A.** (May 20-24, 2007*) "Materials & Processing, Nanocomposite

Products," Carbon Nanotube Manufacturing Special Session, NSTI 2007, Santa Clara, CA.

110. **Campbell, T.A.** (February 20, 2007*) "Nanotechnology: a Truly Interdisciplinary Opportunity," American Institute of Chemical Engineers (AIChE)-Denver Chapter.

111. **Campbell, T.A.** (April 12, 2005*) "Bridging Crystal Growth R&D and Process Control," University of Colorado at Denver, Chemistry Department, student seminar.

112. **Campbell, T.A.**; Mendicino, M.; Fillot, J.-J. (August 13-18, 2000*) "Advances in Crystal Optics for DUV Microlithography," Twelfth American Conference on Crystal Growth & Epitaxy (ACCGE-12), Vail, Colorado.

113. **Campbell, T.A.** (December 16, 1998*) "Preparation of HfB_2 and ZrB_2 single crystals by the floating-zone method (S. Otani, M.M. Korsukova, T. Mitsuhashi, J. Crystal Growth 186 (4), 1998)," Literature Review Seminar, Kristallographisches Institut, Albert-Ludwigs-Universität, Freiburg, Germany (*presented in German*).

114. **Campbell, T.A.**; Koster, J.N. (July 26-31, 1998) "Interface dynamics during indium antimonide crystal growth," Twelfth International Conference on Crystal Growth (ICCG-12), Jerusalem, Israel, presentation.

115. **Campbell, T.A.** (April 21, 1998*) "Der Einfluß der Schmelzzusammensetzung auf die Bridgman-Züchtung von InSb [The Influence of Melt Composition on Bridgman Growth of InSb]," Kristallographisches Institut, Albert-Ludwigs-Universität, Freiburg, Germany.

116. **Campbell, T.A.**; Koster, J.N. (August 4-9, 1996) "*In situ* visualization of constitutional supercooling within indium antimonide crystal growth," Tenth American Conference on Crystal Growth (ACCGE-10), Vail, CO, presentation.

117. **Campbell, T.A.**; Mellor, A., (1990) "A two-dimensional, thermoelastic model of solid rocket propellant material testing," American Society of Mechanical Engineers (ASME) Regional Conference. Tampa Bay, FL, presentation, *awarded "Best Technical Presentation"*

WEBINARS, CONFERENCES, AND WORKSHOPS ORGANIZED

1. "Finance as a Service," (March 25, 2021), FutureGrasp-Business Analytics webinar, three panels: https://www.youtube.com/watch?v=e6m-O__q_jQ, https://www.youtube.com/watch?v=b-Vfd3GrRKo&t, https://www.youtube.com/watch?v=j3fCVH4FIUc&t
2. Artificial Intelligence and the Weaponization of Genetic Data, (October 27, 2020), GeneInfoSec-FutureGrasp webinar.
3. Digital Transformation in Times of Uncertainty, (October 15, 2020), FutureGrasp-Business Analytics Institute webinar.
4. Globalization following Coronavirus, (April 3, 2020), FutureGrasp webinar.
5. "Selected Topics in Artificial Intelligence," (August 7, 2017), National Academies of Sciences, Engineering & Medicine; Intelligence Community Studies Board (ICSB) Colloquium; ~100 participants in person and ~225 via webinar from US Government.
6. "Artificial Intelligence," (July 7-8, 2016), CENTRA Technology facilities, Arlington, VA; funding from the National Intelligence Council, Office of the Director of National

Intelligence; over 60 attendees from US Government and academia.

7. "Moore's Law 2.0," (November 5, 2015), CENTRA Technology facilities, Arlington, VA; funding from the National Intelligence Council, Office of the Director of National Intelligence; over 40 attendees from US Government and academia.
8. "3D and 4D Printing Trends," (August 19, 2015), CENTRA Technology facilities, Arlington, VA; funding from the National Intelligence Council, Office of the Director of National Intelligence; 65 attendees from US Government and academia; 15 federal agencies.
9. ICTAS Research Day, (October 11, 2013), keynote speaker Dr. Steven Chu (12th US Secretary of Energy, 1997 Nobel Prize in Physics), Burruss Hall and Kelly Hall, Virginia Tech, Blacksburg, Virginia.
10. "Additive Manufacturing Symposium—Preparing for National Prominence in a Disruptive Technology," (August 20, 2012), Truman Room, **White House Conference Center** and Hamilton Crowne Plaza, Washington, D.C.; organized and facilitated with OSTP, DoE, LLNL, NIST, and Atlantic Council; funding from Department of Energy and LLNL, 55 attendees from academia, federal and national laboratories, think tanks, and 18 federal agencies.
11. Humboldt Kolleg: Collaboration and Networks in the 21st Century (February 24-25, 2012), funded by the Alexander von Humboldt Foundation; Keynote Dr. Bruce Alberts, editor-in-chief of *Science*, Science Envoy for the Obama administration, and Professor Emeritus of the Department of Biochemistry and Biophysics at the University of California, San Francisco, 86 attendees,
12. Workshop with Defense Laboratory Enterprise on ICTAS-affiliated VTRC-Arlington research, (January 30, 2012), Arlington, VA.
13. "Additive Manufacturing (3D Printing)—State of the Art, Potential, and Implications," (March 23, 2011), Washington, D.C.; sponsored by Atlantic Council; over 35 attendees from intelligence community, industry, U.S. State Department, AAAS, United Nations, universities, Department of Defense, *etc.*; sponsored by Atlantic Council.
14. "The Second Wave of Wireless Communications: A Game Changer for Global Development?" (October 29, 2010), Washington, D.C.; sponsored by Atlantic Council; speakers Prof. Jeff Reed of Virginia Tech and Mr. James Neel of Cognitive Radio Technologies.
15. ICTAS Research Day (September 28, 2010), Virginia Tech, Blacksburg, VA, funded by ICTAS, 265 people in attendance, emcee for all keynotes and talks.
16. Nano-Bio: The Next Transformative Convergence (October 14-15, 2009), Roanoke, VA, Humboldt Kolleg, funded jointly by the Alexander von Humboldt Foundation and the National Science Foundation (NSF), 56 attendees, including keynote Dr. Ferid Murad, MD, PhD (Director at Institute of Molecular Medicine, Professor; The University of Texas Medical School at Houston; 1998 Nobel Laureate in Physiology or Medicine).
17. "Webinar: Nanotechnology Environmental Health and Safety" (Nano-EHS), (May 6 & 28, 2009), in collaboration with United States Measurement System (USMS) office of NIST,

approximately 15 people in attendance.

18. Nano-EHS Workshop (June 9-10, 2008), Crystal City, VA, in collaboration with United States Measurement System (USMS) office of NIST, approximately 100 people in attendance.

FUNDING RECORD (not including proprietary FutureGrasp funding)

Funding Agencies

National—DoE, NSF, DoD, NASA, NIH, NIST, ORNL, DETEC, Institute for Critical Technology and Applied Science (ICTAS) at Virginia Tech, College of Engineering at Virginia Tech, CIT—Center for Innovation Technology in the Commonwealth of Virginia, New America Foundation

International—Alexander von Humboldt Foundation, American Friends of the Alexander von Humboldt Foundation, German Academic Exchange Service (DAAD—Deutsche Akedemischer Austauschungsdienst), Technical University of Munich

Funding Awarded (PI=Principal Investigator)

PI for LEAP Manufacturing, "Energy Storage Systems Campus," University of Texas at Dallas (September 18, 2023), Department of Defense, Total Award ***$30,000,000***, LEAP Manufacturing portion $17,159,311.

ACMI Group, "Munitions Prototype Campus," (September 2023), Department of Defense, ***$74,966,768***, core proposal drafter.

Licensing deal, "Fabrication of Physically Unclonable Functions via Additive Manufacturing," $10,000; Campbell share $2,000.

Proposing team (PI=Craig Woolsey), "A Proposal for an Autonomous Systems Technology, Economics, & Policy Survey for the Commonwealth of Virginia," (October 1, 2013), Commonwealth of Virginia, $139,798, Campbell share $23,766.

PI, ICTAS Proposal for Postdoctoral Associate Research Funding (October 31, 2012), "Chemical Synthesis and Functionalization of Nanomaterials for Additive Manufacturing of Nano-Inks," ICTAS, $31,209.

Talk Honorarium, (October 16, 2012), "Additive Manufacturing—Applications, Challenges, and the Future," Central Intelligence Agency (CIA), Washington, D.C., $1,500; Campbell share $1,500.

PI, Travel award from Alexander von Humboldt Foundation to support trip to Munich, Germany (October 23-27, 2012), 1,500 € ($1,900 US); Campbell share 1,500 € ($1,900 US).

PI, Lawrence Livermore National Laboratory (LLNL), Department of Energy, "Additive Manufacturing Symposium-Preparing for National Prominence in a Disruptive Technology," Hamilton Crowne Plaza, August 20, 2012, $5,000; Campbell share=$5,000.

PI, Office of Intelligence, Department of Energy, "Additive Manufacturing Symposium-Preparing for National Prominence in a Disruptive Technology," White House Conference Center (Truman Room), August 20, 2012, $14,541; Campbell share=$14,541.

PI, CIT Commercialization Fund, Commonwealth of Virginia, "Additive Manufacturing System for Nanocomposites," $200,000; Campbell share=$70,000.

ICTAS NCFL mini-grant; "Synthesis of CdSe Quantum Dots with Different Shapes"; 30 hours on Philips TEM-EM 420; equivalent to ~$2,500.

New America Foundation, Honorarium for writing article "Additive Manufacturing as a Disruptive Technology—Implications of Three-Dimensional Printing," $5,000; Campbell share $5,000.

PI, CRCF Matching Funds, CIT Award from the Commonwealth of Virginia; "Chemical synthesis of square quantum dots"; $50,000; Campbell share=$37,500.

PI, Humboldt Kolleg conference support (February 24-25, 2012), "Collaboration and Networks in the 21st Century," Alexander von Humboldt Foundation, €40,000 ($56,800 as of May 2011); Campbell share=$56,800.

Alexander von Humboldt Foundation, Bessel Award to Prof. Kathy Lu, Department of Materials Science and Engineering, $66,690; introduced and provided guidance on the program to Dr. Lu.

PI, Travel award to invitation-only conference, "New Frontiers: Shifting Trends in the Global Research Landscape and their Impact on Researchers´ Career Patterns," New York City, New York, October 20-21, 2011, Alexander von Humboldt Foundation, $450.

NSF I/U-CRC, "Center for Energy Harvesting and Materials Systems," PI=Shashank Priya, $275,000, wrote the section on ICTAS and edited the proposal

Virginia Tech-NIST Water Workshop, PI=Marc Edwards, $10,000; helped coordinate the proposal with NIST

Private anonymous donor to establish a Virginia Tech center, $5,000,000; co-authored the business plan that clinched the signing of the award

Co-PI, Institute for Critical Technology and Applied Science (ICTAS), "3D Printing with Nano-inks for Physical Cryptography," ICTAS Junior Faculty Collaborative Proposal, PI=Chris Williams, Co-PIs=Kathy Lu, Tom Campbell, Olga Ivanova, $118,810 over two years.

PI, International Graduate School of Science and Engineering (IGSSE) at the Technical University of Munich (TUM) and ICTAS at VT joint proposal, "Nanophotonic Hardware for Physical Cryptography and Security," support for 36 months for one German Ph.D. student, including funds for consumables, travel to Blacksburg, and project management, PIs: Jonathan Finley, IGSSE / TUM, Tom Campbell; €125,000 within Germany only (=~$179,000 as of May 2011; no direct financial benefit to Virginia Tech, but the German Ph.D. student works a few months each year in Blacksburg); Campbell share=$179,000.

PI, Virginia Tech Pratt Funding, $2,000 for Ph.D. student international travel

PI, ICTAS two-year postdoctoral associate support, "Three-dimensional printing of nano-inks," $82,597

PI, DAAD Information Tour 2009, "Regenerative Energies in Germany: State of the Art and Opportunities for International Cooperation in Research and Higher Education," *ca.* $5,000 award for travel support during a 7-day science tour of Germany, 6-12 December 2009

PI, Phase II NSF STTR, "A carbon nanotube metrology system for counterfeit detection," $500,000 (subcontract to Virginia Tech=$165,000); Campbell share=$500,000.

PI, Contract Guest Researcher, United States Measurement System (USMS), National Institute of Standards & Technology (NIST), to research measurement needs for nanotechnology environmental, health and safety, $112,000; Campbell share=$112,000.

PI, Alexander von Humboldt Foundation, Humboldt Kolleg (conference support, "Nano-Bio: The Next Transformative Convergence"); $21,000; Campbell share=$18,000.

PI, NSF Nano and Bio Mechanics Program, supplemental conference support, $14,175; Campbell share=$12,758.

PI; "Carbon nanohorns for biotechnology research (in particular: irreversible electroporation for cancer treatment)," CNMS at ORNL, providing no-cost access to ORNL facilities

PI; Phase I National Institutes of Health (NIH) STTR; "A novel nanomaterials approach for cancer imaging and therapeutic treatment"; $400,000

PI, Phase I National Science Foundation (NSF) STTR; "A carbon nanotube metrology system for industry and research environments"; $150,000

PI, Contract Guest Researcher; United States Measurement Systems (USMS) Group; National Institute of Standards & Technology (NIST); Gaithersburg, MD; $140,000

PI, Phase I Department of Defense (DoD) SBIR; "Novel substrate materials for LWIR and VLWIR detectors"; $100,000

Co-PI, DETEC, National Institute of Standards and Technology, $3,000

Conference travel award, Alexander von Humboldt Foundation, *EuroNanoForum 2007*, ~$1,000

PI, "Toward a Better Understanding of Ge-Si Crystal Growth and its Implications for Semiconductor Processing," Alexander von Humboldt Research Fellowship, one year of postdoctoral associate support plus four months intensive language training in Germany.

PI, NASA Graduate Student Researcher Program Fellowship, Marshall Space Flight Center, NASA, three years of full stipend, including tuition and fees, for Ph.D. at the University of Colorado at Boulder

LEARNING JOURNEYS ORGANIZED (in which members of the intelligence community toured industry and academic labs on a chosen topic)

1. Artificial Intelligence; San Francisco, Silicon Valley, CA: 27-30 June 2017; Boston, MA: 20 July 2017.
2. Biotechnology and Biological Sciences; San Diego, San Francisco, Silicon Valley, CA; 13-18 March 2016.

SERVICE RECORD AT VIRGINIA TECH

- Engagement Leadership Council, Virginia Tech, 2014.
- College of Engineering International Programs Faculty Committee, Virginia Tech, 2014.

- Board of the Center for Digital Research and Scholarship (CDRS), Virginia Tech, 2013 to 2014.
- Program manager on ICTAS-ICAT joint request for proposal (RFP) for awards on science, technology and the arts, 2014.
- Program manager on ISCE-ICTAS joint request for proposal (RFP) for awards on ethics of autonomous vehicles, 2014.
- Virginia Innovation Partnership, i6 Program proposal review panel and commercialization mentor (awards funded by Department of Commerce, Economic Development Administration), 2013 to 2014.
- ICTAS Center for e-Design, NSF I/U-CRC Industry Advisory Board, 2011 to 2014.
- ICTAS Center for Energy Harvesting and Materials Science (CEHMS), NSF I/U-CRC Industry Advisory Board, 2011 to 2014.
- Special Research Faculty Task Force Committee (co-Chair of Career Advancement & Job Security Sub-committee), Virginia Tech, 2011, task force delivered final report to the Office of the Vice President for Research (OVPR) and closed.
- Outreach Council, Virginia Tech, 2010 to 2014.
- Economic Development Leadership Council, Virginia Tech, 2010 to 2014.
- High-Performance Computing (HPC) Committee, Virginia Tech, 2010 to 2014.
- VTTI Green Highway Initiative Advisory Board, Virginia Tech, 2010 to 2014.