# James E. Abbott, Ph.D.

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## Summary

As an innovation leader, I have deep experience building the teams and culture required to do what others say is impossible. In my career I have raised more than $12 million for hardware-based R&D, led advanced R&D and commercialization teams to enable NPVs in excess of $200 million, and been granted 20 US patents. I have worked for large government organizations, a Fortune 50 company, and a small technology startup – I have successfully led across internal and external company boundaries.

## Education

**Ph.D. Physical Chemistry,** Oregon State University (March 2007),
**Masters Physical Chemistry,** Oregon State University (Spring 2002)
**B.S. Physics**, **B.S. Engineering Physics (Mech. Engr.),** Oregon State University (Spring 1997)
**Certified TRIZ Practitioner,** Altshuller Institute for TRIZ Studies (March 2010)
**Certified Professional Scrum Master,** Scrum.org (October 2019)

## Professional Experience

**Faculty – Oregon State University** (September 2018 - Present)

- I was recruited to help provide instruction (Grad 570) to STEM focused students in the fundamentals of business market assessment.

**Director, Electronic Films Engineering, Crown Electrokinetics** (January 2018 – present)

- I lead the commercialization of the core microfluidics technology with responsibility for architecture, materials, fabrication, and manufacturing strategy for smart window applications.
- My team developed advanced materials to improve optical performance by 10X, decreased device power by 8X, transferred to roll to roll processing, and extended device lifetime by more than 20X.
- I developed and executed hiring strategy for internal electronic films team.
- I create intellectual property strategy, invent, and file patent applications – two applications filed.
- I advise CTO on corporate technology and business strategy as well as work with investors directly.

**Co-Founder, Polynovation, LLC.** (April 2017 – present)

At Polynovation we are focused on creating value through innovation across boundaries. Our focus is on blending the leadership acumen, business acumen, and the technology innovation required to create disruptive value for our clients and our internal programs.

**Director, Electronic Films Engineering, 3D Nanocolor** (September 2016 – September 2017)

- Build and manage relationships with key manufacturing partners.
- Verify and develop procedures to ensure volume manufacturability of core technology.
- Create intellectual property strategy, invent, and file patent applications – one application prepared.
- Pitch 3D Nanocolor opportunity to prospective investors and advise on investor communications.

**Senior Engineer/ Scientist, HP Inc.** (January 2007 – September 2016)

- Thin Film Deposition Lead (January 2012 - September 2016)
  - Responsible for HP Thermal Ink Jet (TIJ) and MEMS fabrication thin film roadmap from basic research through manufacturing release and tooling strategy.
  - Project planning, owner of materials innovation portfolio, obtain and maintain project sponsorship**,** mentor junior engineers. Outward facing leadership for HP funded university research and collaboration with other companies.
- Innovation Leader/ Facilitator (Spring 2008 – September 2016)
  - Expert in the application of TRIZ (Theory of Innovative Problem Solving) and its application to Materials Science, MEMS devices, Mechanical Systems, Big Data Ecosystems, Mega Trends Analysis, Technology Evolution and Social Media.

    - Facilitate Innovation workshops from Technician to VP Technologist levels and virtually for international teams from Europe to Asia.
    - Participate in Megatrends Analysis with senior technologists across HP Business units.

- Advanced 3D Printing Technology Lead (January 2014 – September 2015)
    - Recruited for advanced technology program sponsored by VP of printing technology.
    - Principle inventor of a novel approach to 3D printing, built team, demonstrated functional process in less than 1 year collaborating with technologists in US, Europe, and South America.
    - Received more than $1 Million in investment.
- Metal Deposition Lead (September 2011 – January 2012)
    - Responsible for PVD strategy and new technology development for R&D through production.
- Engineering Lead, R&D Physical Vapor Deposition (April 2009 – September 2016)
    - Set research strategy to maintain and expand our world class thin film materials research, development, and commercialization capability.
    - Develop novel materials and processes required to support pan-HP business demands including Thermal Ink Jet, Piezo Ink Jet, Chemical and Biological Sensing, Memristor, and MEMS.
    - In-depth materials support, IP generation, process integration, workcenter communication.
- Advanced Thermal Ink Jet Material Lead and Program Manager (January 2008 – August 2010)
    - Lead a team of senior engineers to develop and commercialize new thin film materials for TIJ.
    - Managed budget of $1 Million per year. Enabled a NPV of > $100 Million.
    - Worked with partner organizations to identify and resolve a critical product issue enabling on time delivery to market.
- Dry Etch Engineer (January 2007 – March 2009)
    - Responsible for production tooling, production processes, and R&D process development.
    - Delivered > $300k/year ETS savings.

**First Level Manager (Officer, Lieutenant), United States Navy** (July 2002 – July 2006)

- Director of Enlisted Physics Division (June 2005 – May 2006)
    - Management and training of 29 engineering and senior technician instructors to accomplish the training of more than 2000 technicians in the fundamentals of nuclear power plant operation.
    - Oversaw complete revision of curriculum, examination materials, and contributed to the rewriting of the course textbook.
    - All instructors qualified on or ahead of schedule. Operated under secret security clearance.
- Senior Nuclear Power Instructor (October 2003 – May 2006)
    - Instructor in introductory nuclear reactor design and operation principles.
    - Managed instructor assignments for 7 other instructors, training for a division of 20 instructors, exam delivery to several classes of 200-300 students.
- Nuclear Power Instructor (July 2002 – October 2003)
    - Instruct enlisted sailors in basic nuclear physics and engineering necessary to operate Naval Nuclear Reactors.
    - Personally interviewed with and selected by the Executive VP of Naval Nuclear Reactors (four-star admiral).

## Additional Business Experience:

**Mentor – Oregon State University/ RAIN Advantage Accelerator** (June 2017 – present)

- Provide mentor guidance to entrepreneurs starting to form their companies with focus on helping technologists learn how to ask business and customer value questions.
- My specialties are intellectual property strategy, materials science, manufacturing, hardware commercialization, preparing investor presentations, and innovation methodologies.

**Member MoMo Bridge, LLC** (January 2017 – present)

- Members of this LLC are invested in Moonshadow Mobile, an Internet of Moving Things company based in Oregon that was the winner of the 2015 Willamette Angel Conference investment.

**Member Willamette Angel Conference (WAC) 2016, 2018 LLC** (March 2016 – present)

- Invested in four startups.
- Led due diligence team for IOTAS – an IoT company in Oregon and WAC finalist, recipient of the People's Choice Award.
- Participated on due diligence teams for three other applicant companies. Three of the four companies I originally picked for due diligence (out of ~40 applicants) were selected as WAC 2016 finalists.

## Academic Experience

**Research Assistant** to Professor Wei Kong, Oregon State University (July 1996-May 2002)

- Studying the electronic structure and dissociation mechanism of nitroaromatic, nucleic acid base, and metal cluster compounds in gas phase.
- Responsible for design and construction of optical mechanical apparatus, using precision laser and high vacuum technologies, maintaining equipment, and completing experiments; coordinating with post-doctoral candidates, graduate students, and technicians.

**Teaching Assistant** for the Chemistry Department of Oregon State University (September 1997-May 2002)

- Teaching general chemistry lab for 100, 200, and engineering levels, grader for third term of Physical Chemistry, and assist with exam creation and oversee exam administration for entire general chemistry course as senior graduate student.

**Lead Sustainability Analyst** for the Industrial Assessment Center of Oregon State (June 1996-May 1997)

- Responsible for directing a team of up to 6 student engineers in taking data and assembling a report characterizing strategies for the reduction of energy use and waste production.

**Energy Reduction Analyst** for the Industrial Assessment Center of Oregon State (June 1995-June 1996)

- Responsible for collecting data and formulating reports characterizing strategies for a company to decrease energy usage.

## Leadership Experience

- Extensive experience leading teams of people from diverse backgrounds as a Naval Officer, researcher, engineer, and business leader.
- Leading teams of engineers and technicians to achieve production, research and development goals.
- Extensive oral and written experience presenting needs to senior executives, investors, departments, and teams in my organization as well as different organizations to develop unified plans of action and obtain funding.
- Director Academic Advisors for Excellence Program at the Naval Nuclear Power Training Command (NNPTC) in charge of two coordinators and 90 advisors working to train enlisted students in time management and study skills. (2004 – May 2006)

## Innovation Facilitator/ Strategist

- Expert in the TRIZ innovation methodology.
- Experienced in participating in and facilitating innovation strategy sessions with teams of executives and senior technical strategists.
- Experienced building technology roadmaps for R&D through manufacturing tooling strategy.

## Scientific/Engineering Experience and Abilities

- Principle inventor and Co-inventor of multiple new thin film materials for MEMS and advanced electronic devices, nano structured materials, and additive manufacturing methods.
- Expert in novel energy delivery methods for additive manufacturing.
- Formulation of energy curable resins.
- Microscale embossing.
- Broad and in-depth experience in Physics, Chemistry, Materials Science, Physics of Fundamental Biological Molecules, Mechanical Design, Physical Optics.
- Significant experience working with thin film materials to develop MEMS technologies and characterize both materials and devices.
- Expertise in Spectroscopic techniques: Electronic, Polarization, Photodissociation, Photoionization, Mass, and high-resolution Photoelectron Spectroscopy.
- Designing, assembling, and operating experiments in High Vacuum chambers.
- Operating and maintaining high power pulsed Nd:YAG, and tunable dye lasers.
- Experience with laser desorption/ablation of metals using Nd:YAG lasers; using creative solutions to design and build complex machinery forming a stable gas phase source for formation of sodium clusters in high vacuum and obtaining the first data using a recently developed experimental technique.

## HP Projects

- **Advanced Materials Liaison with HP Labs** (2013 – August 2016): Communicate HP Corvallis capabilities to HP Labs (HPL), build relationships with key HPL contributors, co-author Statement of Work (SOW) subsequently signed by VP of HP Labs and VP of HP Printing and Technology Development resulting in the investment of 4 FTE of funding into HP Corvallis from HPL.
- **Principle Inventor and Technical Lead for 3D Ceramics** (June 2014 – June 2015) Leadership of a team of senior engineers and technicians in the development of a disruptive 3D Printing technology. The technology promises better materials properties and 40X faster part production than the 3D competition, all with low cost energy and materials. This technology heavily leverages the HP Multi Jet Fusion architecture. These responsibilities included fundamental research, technology development, IP strategy, program management, fund raising and business development efforts.
- **3D Printing Advanced Materials and Energy Delivery Engineer** (February 2014 – August 2016) Responsible for developing and driving disruptive materials and system innovation. This work resulted in 6 filed patents in the first year and the launch of microwave processing for 3D printed materials. This work also resulted in a $500k investment into HP Corvallis from the CTO's office.
- **Innovation Leader** (Spring 2008 – August 2016): Facilitate and contribute to innovation workshops across HP business units. Facilitated a 2 day strategy session for HP Fellows and Distinguished Technologists in HP Enterprise Services (ES) (March 2013) and participated in follow on Mega Trends analysis (2013 - spring 2014). Facilitated innovation workshops for next generation Thermal Ink Jet (Winter 2014), Chemical Sensing (Fall 2010), ES sponsored 3D Printing (Spring 2012), Social Media (Fall 2012), and other areas. Provide TRIZ introduction to other HP sites to help the team decide for TRIZ training (Spring 2014).
- **Technical Lead for HP Thin Film Deposition** (February 2012 – August 2016): Technical leadership, project planning, and capability roadmapping for PVD, PECVD, and ALD deposition processes in the clean room facility. Collaborate to set scope and priorities for projects, build business justification.
- **HP Principle Investigator for Oregon State University Amorphous Metals** (September 2011 – August 2016): Help build justification for and manage >$800k of HP funded research at OSU focused on providing a material solution for long life TIJ reliability, new class of materials currently being investigated for TIJ production.
- **HP Principle Investigator Oregon State University Lead Free Piezo** (April 2013 – August 2016): Manage >$100k HP funded research at OSU focused on development and licensing of Pb-Free piezo ceramic materials and associated IP strategy.
- **Thin Film Deposition Lead Multi-Component Oxide (MCO) Semiconductor** (April 2009 – 2012): Develop, scale, and sustain deposition processes to support the oxide semiconductor and related depositions. Successfully scaled process from partial wafer to whole wafer and invented a novel method for higher deposition rate sputtering of a ZnSn-oxide semiconductor.
- **Thin Film Deposition Lead *DARPA* Very High Efficiency Solar Cell (VHESC)** (April 2009 – October 2011): Develop materials, specifications, and initial reliability assessment for a metal coated polymer reflector and related documentation required by a DARPA program. Led team to demonstrate the world's first high performance dielectric mirror on a low-cost plastic substrate. Managed materials collaboration with subsequent start-up company.
- **Team Lead Advanced Materials for TIJ Reliability** (February 2008 – August 2010): Led the R&D team with 3 FTE of engineering staff on a multi-million-dollar project through critical checkpoints and worked with partners to gain POR support for materials solution to enable a > $200 million NPV for HP.

## Technical Leadership

Pan-HP Materials Core team – founding team member of ~ 6 technologists across HP to set strategy for virtual community focused on materials science. (2015 – August 2016)
Pan-HP Microtech Manufacturing of Materials Core Team – set strategy for virtual community
Technical Abstract Reviewer for TechCon 2015

## Professional Affiliations

American Ceramic Society (2015 – 2016)
American Chemical Society (2001 - present)
Peer reviewer for Applied Physics A
Willamette Angels (2016-present)

## Business Awards:

Winner - Willamette Innovators Network Shark Tank Pitch 2017

## Academic Awards:

Oregon State University, Department of Science Young Alumni Award (2014)
HP TechCon Honorable Mention Abstract 2012
HP TechCon Honorable Mention Abstract 2010
HP TechCon Honorable Mention Abstract 2009
Teaching Assistant awards (1997-1998, 1998-1999, 1999-2000)
Sigma Pi Sigma Physics Honor Society (1996)
Pi Tau Sigma Mechanical Engineering Honor Society (Served as President and Vice President of the local section) (1994)
Alpha Lambda Delta Honor Society (1992)

## Military Awards:

Navy and Marine Corps Commendation Medal (2006)
US Navy Master Training Specialist Award (2004)
Global War on Terror Medal (2003)
National Defense Medal (2002)

## Patents Filed/ Granted

**More than 50 US Patent Applications** filed in inorganic materials, thin films, chemical sensing, MEMS device design, and 3D printing including:

Plasmonic Nanostructure Including Sacrificial Passivation Coating (2016)
Particulate Build Material (2016)
Three-dimensional (3D) Printing (2016)
Color Printing and Three-dimensional (3D) Printing (2016)
Three-dimensional (3D) Printing with a Sintering Aid/ Fixer Fluid and a Liquid Functional Material (2016)
Three-dimensional (3D) Printing with a Detailing Agent Fluid and a Liquid Functional Material (2016)
Extraction of Digitally Printed Build Material (2015)
Removable Cassette for 3D Printers (2015)
Stabilizing Liquid Functional Material for Three–dimensional (3D) Printing (2015)
Three-dimensional (3D) Printing (2015)
Printhead Structure (2015 – **Granted US Patent 10,532,571**, dated January 14, 2020)
Susceptor Materials for 3D Printing Using Microwave Processing (2015)
Lighting for Additive Manufacturing (2014)
Amorphous Metal Alloy Electrodes in non-volatile device applications (2014 - **Granted US Patent 10,177,310**, dated January 8, 2019)
Fabricating a Three-Dimensional Object (2014 – **Granted US Patent 10,478,994**, dated November 19, 2019)
Consolidating a Build Material Substrate for Additive Manufacturing (2014)
Wear Resistant Coating (2014)
Elastic Device (2014 – **Granted US Patent 10,125,010** – dated November 13, 2018)
Electrocaloric Heating and Cooling Device (2014- **Granted US Patent 9,873,274**, dated January 23, 2018)
Electrocaloric Device (2014 - **Granted US Patent 10,056,539**, dated August 21, 2018)
Oxygen Conducting Bismuth Perovskite Material (2014)
Piezoelectric Thin Film Stack (2013)
Thermal Inkjet Printhead Stack with Amorphous Metal Resistor (2013 – **Granted US Patent 9,469,107**, dated October 18, 2016)
Amorphous Thin Metal Film (3 Metal) (2013 – **Granted US Patent 10,449,763**, dated October 22, 2019; **TW1561660B** – dated December 11, 2016)
Amorphous Thin Metal Film (4 Metal) (2013 – **TW1515304B** – dated January 1, 2016)
Thermal Inkjet Printhead Stack with Amorphous Thin Metal Protective Layer (2013 – **Granted US Patent 9,511,585**, dated December 6, 2016)
Film Stack Including Adhesive Layer (2013 – **Granted US Patent 9,636,902,** dated May 2, 2017)
Film Stack Including Adhesive Layer (2013 – **Granted US Patent 9,352,532**, dated May 31, 2016)
Dosimetry Via Platinum-Ruthenium Nanoparticle- Decorated Carbon Nanostructure (2013 – **Granted US Patent 9,304,095**, dated April 5, 2016)
Formation of an Open Well Electrochemical Sensing Cell with Self Patterned Electrodes and Fludic Channels by Using Embossing Methods (2013 – **Granted US Patent 10,359,392 –** dated July 23, 2019)
Formation of an Open Well Electrochemical Sensing Cell with Self Patterned Electrodes by Using Embossing Methods (2013 – **Granted US Patent 9,557,288**, dated January 31,2017)
Thin Film Stack (2013)
Thin Film Stack (2013)
Thin Film Stack (2012 – **Granted US Patent 10,141,497** – dated November 27, 2018; **EP2850667B1 –** dated October 25, 2017)
Thin Film Stack (2012 – **Granted US Patent 9,190,598**, dated November 17, 2015, **EP2852989B1**, dated November 30, 2016) )
Piezoelectric Actuator and Method of Making a Piezoelectric Actuator (2012 - **Granted US Patent 9,266,326**, dated February 23, 2016)
Electrochemical Sensing Array (2012 – **Granted US Patent 9,028,662**, dated May 12, 2015)
Cavity Enhanced Spectroscopy (2012)
Gas-Phase Delivery System for Molecule Sensing Apparatus (2012 – **Granted US Patent 10,520,440,** dated December 31, 2019)
Apparatus for Performing Spectroscopy (2012)
Micro-Scale Pendulum (2012)
Substrate for an Optical Film Stack (2011)

Metal Reflectors (2011)
Fluid Ejection Device (2010 – **Granted US Patent 8,684,501**, dated Apr 1, 2014; **EP2563596B1**, dated July 22, 2015)
Other patent applications have not been listed until they are public for confidentiality reasons.

## Publications in Refereed Journals

9. McGlone, John Michael; Olsen, Kristopher R.; Stickle, William F.; **Abbott, James E.;** Pugliese, Roberto A.; Long, Greg S.; Keszler, Doug; Wager, John F., "TaWSi amorphous metal thin films: composition tuning to improve thermal stability," *Materials Research Society Communications*, in press.

8. John M. McGlone, Kristopher R. Olsen, William F. Stickle, **James E. Abbott,** Roberto A. Pugliese, Greg S. Long, Douglas A. Keszler, John F. Wager, "Ta-based amorphous metal thin films," *Journal of Alloys and Compounds*, vol. 650, pp. 102-105, 2015.

7. Kangho Lee, Vittorio Scardaci, Hye-Young Kim, Toby Hallam, Hugo Nolan, Brian E. Bolf, Gregory S. Maltbie, **James E. Abbott**, Georg S. Duesberg, "Highly sensitive, transparent, and flexible gas sensors based on gold nanoparticle decorated carbon nanotubes," *Sensors and Actuators B*, vol. 188, p. 571, 2013.

6. **James E. Abbott**, Xianzhao Peng, and Wei Kong, "Symmetry properties of electronically excited states of nitroaromatic compounds," *J. Chem. Phys*, vol. 117, p. 8670, 2002.

5. Xianzhao Peng, **James E. Abbott**, Wei Kong, "ZEKE and MATI spectroscopy of Na·(NH3)n (n = 1, 2, and 4) complexes," *J. Chem. Phys*, vol. 117, p. 8670, 2002.

4. X. Peng, **J. Abbott**, W. Kong, "Associative formation of Rydberg state clusters from collisions between a Rydberg state species and a ground state neutral atom," *J. Chem. Phys*, vol. 113, p. 3020, 2000.

3. K.J. Castle, **J. Abbott**, X. Peng and W. Kong, "Photodissociation of o-nitrotoluene between 220 and 250nm in a uniform electric field," *J. Phys. Chem*, vol.104, p. 10419, 2000.

2. K.J. Castle, **J.E. Abbott**, X. Peng and W. Kong, "Direction of the transition dipole moment of nitro-benzene determined from oriented molecules in a uniform electric field," *J. Chem. Phys*, vol. 113, p. 1415, 2000.

1. K.J. Castle, **J. Abbott**, X. Peng and W. Kong, "Photodissociation of t-butyl nitrite between 220 and 250nm: internal energy distributions of NO," *J. Chem. Phys. Lett*, vol. 318, p. 565 2000.

## Presentations, Conference Proceedings, and Position Papers

Invited Presentation: "The Science Behind Metals for Ink Jet," National Award Symposium for Innovation in Materials, American Chemical Society, April 2017

Paper and Presentation: HP Tri Team Summit, June 2016

Poster Presentation: HP Vancouver Innovation Fair, May 2016

Webinar Presentation: "Advanced Materials Processing – Amorphous Metal Thin Film for Thermal Ink Jet and Beyond," James Abbott, et. al., HP Webinar, February 2016.

Public HP White Paper: "Enterprise 3D Printing Ecosystem," Kas Kasravi, Will Allen, Prakash Reddy, Mitch Wright, Paul Pond, Babak Makkinejad, Cory Wick, **James Abbott,** May 2015.

Webinar Presentation: "HP Novel Materials and Thin Film Capabilities," James Abbott, HP MicroTech Summit, May 2015.

Paper and Presentation, Title omitted for confidentiality reasons, David Champion, **James Abbott**, et. al., HP TechCon, 2015.

Co-Facilitator, HP TechCon Strategy Session: "3D Printing Ecosystem for the Enterprise," Kas Kasravi, Will Allen, **James Abbott**, TechCon June 2015.

Webinar Panel Member: "Postgraduate Career Strategies: Industry," Oregon State University Center for Sustainable Materials Chemistry, November 2014.

HP R&D Engineering Seminar: "Advanced Amorphous Metals for Thermal Ink Jet and Beyond," **James Abbott**, et. al., Webinar, October 2014

Paper and Poster Presentation: "Novel Amorphous Metal Thin Films for MEMS Applications," **James Abbott**, Hilton Head MEMS Conference, June 2014.

Paper and Poster Presentation: "Advanced Amorphous Metals for Thermal Ink Jet and Beyond," **James Abbott**, et. al., HP TechCon 2014.

Seminar: "Innovation, Adhesion, and Self-Assembled Nanostructures," **James Abbott**, Oregon State University Materials Science Seminar, November 2013.

HP R&D Engineering Seminar: "Nano-Engineered Piezoceramic Actuator for MEMS Devices," **James Abbott**, et. al., Webinar January 2014.

Paper and Presentation: "Nano-Carbon Based 'Electronic Nose'," Graeme Scott, Richard Coull, Vitorio Scardaci, **James Abbott**, et. al., HP TechCon 2013.

Paper and Poster Presentation: "Nano-Engineered Piezoceramic Actuator for MEMS Devices," Peter Mardilovich, **James Abbott**, et. al., HP TechCon 2013.

Presentation: "Alternative Adhesion Layers for Noble Metal/Si Substrates - Impact on PZT Thin Films for MEMS," Electronic Materials and Applications 2013 (EMA2013), Peter Mardilovich, **James Abbott**, et. al., January 2013.

Co-Facilitator, HP TechCon Strategy Session: "Innovation Methodologies," Kas Kasravi, **James Abbott**, TechCon 2013

Facilitator HP TechCon Strategy Session: "Nano Technology: HP Past, Present, and Future," **James Abbott**, TechCon 2013.

Co-Facilitator, HP TechCon Strategy Session: "Innovation Methodologies," Kas Kasravi, Will Allen, **James Abbott**, TechCon, March 2012

Paper and Presentation: "Amorphous oxide transistor electrokinetic reflective display on flexible glass," Proceedings of the 18th International Display Workshops, Devin A. Mourey, Randy L. Hoffman, Sean M. Garner, Arliena Holm, Brad Benson, Gregg Combs, **James E. Abbott**, et al., 2011

Paper and Presentation: "An integrated back-channel etch process for zinc tin oxide thin-film transistors," Randy L. Hoffman, **James Abbott**, Greg Long, William Stickle, Tim Koch, Arliena Holm, Daniel Pugh, Michael Groh, Craig Tress, Stephen Bylund, Transparent Conductive Materials, October 2010

Poster Presentation: "Resistor Life and Thermal Efficiency Improvement Overview," James Abbott, etal., HP Corvallis Technology Fair April 2008

**Referees**

Jim Stasiak

Will Allen

Kas Kasravi

William Stickle

Peter Mardilovich

HP CEO talking about my HP Ceramics 3DP
https://www.forbes.com/sites/peterhigh/2015/06/23/the-vision-of-hp-inc-s-future-ceo-3-d-printing-immersive-computing-and-mobile/#22f9e39a4e41