# J. Kevin Shurtleff, PhD, MBA

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## Research

UVU Algae Harvesting Boat to Prevent/End Harmful Algae Blooms (HABs)
Video: https://www.youtube.com/watch?v=DDRe0cYcKPw
Presentation: https://uvu.edu/cos/docs/presentations/shurtleff_preventing_habs.pptx

## Education

MBA, Marriott School, Brigham Young University, Provo, Utah, Aug. 2001
Post-Doctoral Appointment, University of Utah, SLC, Utah, Oct. 2001
PhD, Physical Chemistry, Brigham Young University, Provo, Utah, Aug. 1994; dissertation, "Atomic Layer Epitaxy for the Production of Multi-layer X-ray Mirrors"
BS, Physical Chemistry, Brigham Young University, Provo, Utah, Aug. 1987

## Positions and Employment

Associate Professor, Chemistry Department, Utah Valley University, Jul. 2018 to present.
Assistant Professor, Chemistry Department, Utah Valley University, Aug. 2012 to Jun. 2018.
Branch Lead, Algae Energy Systems, Energy Dynamics Lab, Utah State University, Jun. 2010 to Aug. 2012.
Founder & President, MicromistNOW, Jun. 2014 to present.
Associate Director Eastern Region, Utah Science Technology and Research, Dec. 2008 to May 2010
Founder, Manager, and President, Mountain West Energy, LLC, Aug. 2005 to present
Founder, Chief Technology Officer, and Director, Trulite, Inc., Aug. 2004 to Mar. 2006
Founder & President of Synexus Technology, LC, Aug. 2005 to Mar. 2006
Founder & President, Trulite Technology, LC, May 2002 to Aug. 2004
Senior Engineer, Sarcos Research Corporation, Dec. 2001 to Sep. 2002
Research Associate, University of Utah, Department of Materials Science and Engineering, Dec. 1998 to Oct. 2001
Product Director, MOXTEK Inc., Orem, Utah, Sept. 1988 to Dec. 1998
Research Assistant, Brigham Young University, Sep. 1986 to Sep. 1988, part-time
Technical Writer, Megadiamond, May 1986 to Sep. 1986

## Teaching

### Utah Valley University Courses Taught

CHEM 1010 – Introduction to Chemistry
CHEM 1110 – Elementary Chemistry for the Health Sciences
CHEM 1210 – Principles of Chemistry I
CHEM 1215 – Principles of Chemistry I Laboratory
CHEM 1220 – Principles of Chemistry II
CHEM 1225 – Principles of Chemistry II Laboratory
CHEM 3060 – Physical Chemistry I
CHEM 3065 – Physical Chemistry I Lab
CHEM 3070 – Physical Chemistry II
CHEM 3075 – Physical Chemistry II Lab
CHEM 3115 – Physical and Inorganic Chemistry Laboratory
CHEM 3800, PHYS 3800, ENVT 3800 – Energy Use on Earth
CHEM 489R – Undergraduate Research in Chemistry

### Utah Valley University Teaching Certificates

CSH Teaching Academy
New Faculty Teaching Scholars
Undergraduate Research
Large Class Instruction

**University of Utah Courses Taught**

MSE 5201 - Semiconductor Device Physics I
MSE 6265 - Advanced Processing of Semiconductors

## Professional Development

**Publications**

1. Kevin Shurtleff, Austin Bettridge, Kyle Sweetman, Julio Gomez, Mung Nam Ng, Ryan Bernal, "Waste and Cost Reduction by Reprocessing Used Motor Oil into a Synthetic Diesel Fuel", *International Journal of Innovative Studies in Sciences and Engineering Technology*, **Vol 3**, Issue 6, (2017).
2. S.W. Jun, R.T. Lee, C.M. Fetzer, J.K. Shurtleff, and G.B. Stringfellow, "Isoelectronic surfactant induced surface step structure and correlation with ordering in GaInP", *Journal of Crystal Growth*, **235**(1-4), 15, (2002).
3. J.K. Shurtleff, R.T. Lee, C.M. Fetzer, G.B. Stringfellow, S. Lee, and T.Y. Seong, "Time Dependent Surfactant Effects on the Growth of GaInP Heterostructures by Organometallic Vapor Phase Epitaxy", *Journal of Crystal Growth*, **234**(2), 327, (2002).
4. F. Dimroth, A. Zoltar, J.K. Shurtleff, and G.B. Stringfellow, "Influence of Sb, Bi, Tl, and B on the incorporation of N in GaAs", *Journal of Applied Physics*, **91**(6), 3687, (2002).
5. S.W. Jun, G.B. Stringfellow, A. Howard, C.M. Fetzer, and J.K. Shurtleff, "Kinetics of Te doping in disordering GaInP grown by organometallic vapor phase epitaxy", *Journal of Applied Physics*, **90**(12), 6048, (2001).
6. R.T. Lee, C.M. Fetzer, S.W. Jun, D.C. Chapman, J.K. Shurtleff, G.B. Stringfellow, Y.W. OK, and T.Y. Seong, "Enhancement of Compositional Modulation in GaInP epilayers by the addition of surfactants during OMVPE growth", *Journal of Crystal Growth*, **233**(3), 490, (2001).
7. J.K. Shurtleff, S.W. Jun, and G.B. Stringfellow, "Surfactant effects on doping of GaAs grown by organometallic vapor phase epitaxy", *Appl. Phys. Lett*., **78**(20), 3038 (2001).
8. G.B. Stringfellow, R.T. Lee, C.M. Fetzer, J.K. Shurtleff, Yu Hsu, S.W. Jun, S. Lee, and T.Y. Seong, "Surfactant Effects of Dopants on Ordering in GaInP", *J. Electronic Materials*., **29**(1), 134 (2000).
9. R.T. Lee, C.M. Fetzer, J.K. Shurtleff, and G.B. Stringfellow, "Surfactant controlled growth of GaInP by organometallic vapor phase epitaxy", *J. Appl. Phys*., **87**(8), 3730 (2000).
10. Y. Hsu, C.M. Fetzer, G.B. Stringfellow, J.K. Shurtleff, C.J. Choi, and T.Y. Seong, "Heterostructures in GaInP grown using a change in Te doping", *J. Appl. Phys*., **87**(11), (2000).
11. C.M. Fetzer, R.T. Lee, J.K. Shurtleff, G.B. Stringfellow, S.M. Lee, and T.Y. Seong, "The use of a surfactant (Sb) to induce triple period ordering in GaInP, *Appl. Phys. Lett.*, **76**(11), 1440 (2000).
12. S.W. Jun, C.M. Fetzer, R.T. Lee, J.K. Shurtleff, and G.B. Stringfellow, "Bi surfactant effects on ordering in GaInP grown by organometallic vapor phase epitaxy", *Appl. Phys. Lett*., **76**(19), 2716 (2000).
13. G.B. Stringfellow, J.K. Shurtleff, R.T. Lee, C.M. Fetzer, "Surface processes in OMVPE - the frontiers", *J. Crystal Growth*., **221**, 1 (2000).
14. J.K. Shurtleff, R.T. Lee, C.M. Fetzer, and G.B. Stringfellow, "Band-gap control of GaInP using Sb as a surfactant", *Appl. Phys. Lett*., **75**(13), 1914 (1999).

**Presentations**

2021 American Chemical Society Northwest Regional meeting, oral presentation, "Low cost, solar water purifier to reduce clean water scarcity", Kevin Shurtleff, Nathan Cornell, Ashley Larsen, and Gerrit Burgener.

2019 American Chemical Society national meeting, Cellulose Division, oral presentation, "Direct algae harvesting to prevent harmful algae blooms and produce renewable biofuel", Kevin Shurtleff, Brenden Truman, Tyler Johnson, Phillip Rich, Austin Bettridge, Blake Allred, Anastasiia Matkovska, Jeffrey Keller, Jacob King, Spencer Jacobsen.

2017 Utah Academy of Science, Arts, and Letters annual conference, oral presentation, "Waste and Cost Reduction by Reprocessing Used Motor Oil into a Synthetic Diesel Fuel", Kevin Shurtleff, Austin Bettridge, Kyle Sweetman, Mung Nam Ng, Ryan Bernal.

2017 American Chemical Society national meeting, Energy and Fuels Division, poster paper, "Waste and Cost Reduction by Reprocessing Used Motor Oil into a Synthetic Diesel Fuel", Kevin Shurtleff, Austin Bettridge, Kyle Sweetman, Mung Nam Ng, Ryan Bernal.

2017 Utah Conference on Undergraduate Research, poster paper, "Waste and Cost Reduction by Reprocessing Used Motor Oil into a Synthetic Diesel Fuel", Austin Bettridge, Kyle Sweetman, Mung Nam Ng, Ryan Bernal, Kevin Shurtleff.

2017 Utah Conference on Undergraduate Research, poster paper, "Low Cost, Balloon Lifted, Wind Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Jared Gordon, Andrew Pigott, Julio Gomez, Nicholas LaMay, Kevin Shurtleff.

2017 Utah Conference on Undergraduate Research, poster paper, "Low Cost, Low Impact, Portable, River Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Jared Gordon, Andrew Pigott, Julio Gomez, Nicholas LaMay, Kevin Shurtleff.

2017 American Chemical Society Regional meeting, poster paper, "Low Cost, Low Impact, Portable, River Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Jared Gordon, Andrew Pigott, Julio Gomez, Nicholas LaMay, Kevin Shurtleff.

2017 Utah Valley University Engagement Week, poster paper, "Waste and Cost Reduction by Reprocessing Used Motor Oil into a Synthetic Diesel Fuel", Austin Bettridge, Kyle Sweetman, Mung Nam Ng, Ryan Bernal, Kevin Shurtleff.

2017 Utah Valley University Engagement Week, poster paper, "Low Cost, Balloon Lifted, Wind Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Jared Gordon, Andrew Pigott, Julio Gomez, Nicholas LaMay, Kevin Shurtleff.

2017 Utah Valley University Engagement Week, poster paper, "Low Cost, Low Impact, Portable, River Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Jared Gordon, Andrew Pigott, Julio Gomez, Nicholas LaMay, Kevin Shurtleff.

2017 American Chemical Society Regional meeting, poster paper, "Low Cost, Low Impact, Portable, River Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Jared Gordon, Andrew Pigott, Julio Gomez, Nicholas LaMay, Kevin Shurtleff.

2016 Utah Conference on Undergraduate Research, poster paper, "Low Cost, Balloon Lifted, Wind Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Vlad Boyko, Phillip Witt, Kevin Shurtleff.

2016 Utah Conference on Undergraduate Research, poster paper, "Novel, Low Cost, Solar Thermal, Phase Change, Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Collin Manitoken, Preston Eyre, Kevin Shurtleff.

2016 Utah Valley University Engagement Week, poster paper, "Waste and Cost Reduction by Reprocessing Used Motor Oil into a Synthetic Diesel Fuel", Ryan Bernal, Kyle Sweetman, Mung Nam Ng, Kevin Shurtleff.

2016 Utah Valley University Engagement Week, poster paper, , "Low Cost, Balloon Lifted, Wind Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Vlad Boyko, Phillip Witt, Kevin Shurtleff.

2016 Utah Valley University Engagement Week, poster paper, "Low Cost, Low Impact, Portable, River Powered Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Antonio Trevino, Brennan Christensen, Jordan Lloyd, Kevin Shurtleff.
2016 Utah Valley University Engagement Week, poster paper, "Novel, Low Cost, Solar Thermal, Phase Change, Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Collin Manitoken, Preston Eyre, Kevin Shurtleff.
2015 Utah Valley University Engagement Week, oral presentation, "Novel, Low Cost, Solar Thermal, Phase Change, Air Compressor for Clean, Sustainable, Renewable, Electricity Generation", Rodney Jackson, Collin Manitoken, Jake Merrill, Christian Oaks, Parker Salmans, , Preston Eyre, Kevin Shurtleff.
2015 Utah Valley University Engagement Week, oral presentation, "Student Engaged Renewable Energy Project for Poor, Developing Nations", Brady Anderson, Garrett Cooper, Kevin Hagood, Kyle Koller, Cameron Lohser, Mario Salcedo, Kevin Shurtleff.
2013 UVU Earth Science Seminar, oral presentation, "Low Cost Renewable Energy Generation for Underdeveloped Communities", Kevin Shurtleff.

**Patents**

US patent 10,851511, "Mobile Microalgae Harvesting", December 1, 2020.
US patent pending, 62/213,754, "Apparatus and Method for Power Generation Using Compressed Air", September 3, 2015, abandoned.
US patent 8,357,213 granted, "Apparatus, system, and method for promoting a substantially complete reaction of an anhydrous hydride reactant", January 22, 2013.
US patent 8,205,674 granted, "Apparatus, system, and method for in-situ extraction of hydrocarbons", June 26, 2012.
US patent 8,152,873 granted, "System for generating hydrogen from a chemical hydride", April 10, 2012.
US patent 9,067,152 granted, "Systems and Methods for Improving Rate of Evaporation", June 30, 2015.
US patent 7,651,542 granted, "System for generating hydrogen from a chemical hydride", January 26, 2010.
US patent 7,648,786 granted, "System for generating electricity from a chemical hydride", January 19, 2010.
US patent 7,556,660 granted, "Apparatus and system for promoting a substantially complete reaction of an anhydrous hydride reactant", July 7, 2009.
US patent 7,438,732 granted, "Hydrogen generator cartridge", October 21, 2008.
US patent 7,393,369 granted, "Apparatus, system, and method for generating hydrogen", July 1, 2008
US patent 5,458,084, "X-ray wave diffraction optics constructed by atomic layer epitaxy", October 17, 1995.

**Funded Current and Completed Research**

Utah State Department of Forestry, Fire, and State Lands grant, $406,000, 2021-2022
Algae Harvesting Boat to End Harmful Blooms on Utah Lake and Beyond
We received the grant to build and operate a full-scale, algae harvesting boat on Utah Lake during May - August 2022. Four students successfully operated the boat every weekday throughout the summer season. We were able to prevent HABs in the areas we treated.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2021
Utah Valley University College of Science

Production of Single Crystal Mono-Layer Graphene on a Copper Substrate Catalyst Using Plasma CVD
One of my research students received this grant to modify the RF plasma sputtering system in the Physics Department so we could then deposit graphene from methane using the system.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2020-2021
Utah Valley University College of Science
UVU Solar Water Purifier
Three research students received this grant to design build and test a low cost solar water purifier.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2018-2020
Utah Valley University College of Science
Prevention of hazardous algal blooms by direct micro-algae harvesting including biomass energy production
One of my research students received this grant to continue our work on the direct microalgae harvesting to prevent harmful algal blooms. We built and tested a continuously swept, diatomaceous earth, filter and purchased and tested a plate and frame filter press with cellulose filter aid addition. Both filtration technologies were successful.
Role: Project manager and faculty mentor for undergraduate research students.

Grant for Engaged Learning (GEL), 2017-2018
Utah Valley University Office of Engaged Learning
Prevention of hazardous algal blooms by direct micro-algae harvesting including biomass energy production.
For this project, my research students researched, designed, built, and tested a lab-scale, micro-algae harvesting method that can be deployed directly on the contaminated body of water to remove the algae and biological nutrients, cleaning the water. Additional funding will enable us to build a full-scale algae harvester to be deployed on Utah Lake. The harvested algae will be sun dried on-shore and gasified to generate electricity.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2016-2017
Utah Valley University College of Science and Health
Low cost, low impact, sustainable, renewable electricity generation using a river powered, paddle wheel, air compressor.
One of my research students received this grant to continue our work on the river powered, paddle wheel, air compressor system developed during the previous GEL grant. The first design did not produce enough compressed air to be useful. This grant was used to redesign, rebuild and re-test the paddle wheel air compressor.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2016-2017
Utah Valley University College of Science and Health
Reprocessing of waste motor oil into a synthetic diesel fuel.
One of my research students received this grant so he could attend American Chemical Society 2017 Spring Conference in San Francisco. He also received additional funds so we could complete the project.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2015-2016
Utah Valley University College of Science and Health
Reprocessing of waste motor oil into a synthetic diesel fuel.
One of my research students received this grant to continue our work on the waste motor oil project.
Role: Project manager and faculty mentor for undergraduate research students.

Grant for Engaged Learning, 2015-2016
Utah Valley University Office of Engaged Learning
Low cost, low impact, sustainable, renewable electricity generation using rivers in Haiti.
This project was awarded in conjunction with Dr. Steve Emerman and Dr. Eddie Cadet in the Department of Earth Science. This project is for students to research, design, build, and test a river powered air compressor, compressed air storage, and air powered electrical generation system. This compressor system will be integrated with the balloon lifted wind turbine air compressor system for more a stable supply of electricity.
Role: Project manager and faculty mentor for undergraduate research students.

Scholarly Activities Committee (SAC) grant, 2015-2016
Utah Valley University College of Science and Health
Low cost, low impact, sustainable, renewable electricity generation using a balloon lifted air compressor.
Two of my research students received this grant to continue our work on the balloon lifted, wind powered, air compressor, compressed air storage, and air powered electrical generation system.
Role: Project manager and faculty mentor for undergraduate research students.

Grant, 2014-2015
Utah Valley University Facilities
Reprocessing of waste motor oil into a synthetic diesel fuel.
This project is for students to research, design, build, test, and demonstrate a process for reusing the waste motor oil generated on campus by the Aviation Department to make a synthetic diesel fuel that can be used in the utility vehicles operated by Facilities.
Role: Project manager and faculty mentor for undergraduate research students.

Grant for Engaged Learning (GEL), 2014-2015
Utah Valley University Office of Engaged Learning
Low cost, sustainable, renewable energy production using a solar thermal phase change generator for developing communities.
This project is for students to research, design, build, test, and demonstrate a solar thermal phase change air compressor. This system will be integrated with the balloon lifted, wind turbine powered, air compressor system for a more stable supply of electricity.
Role: Project manager and faculty mentor for undergraduate research students.

Grant for Engaged Learning (GEL), 2013-2014
Utah Valley University Office of Engaged Learning
Low cost, sustainable, renewable electricity generation using a balloon lifted wind turbine powered air compress for developing communities.
This project is for students to research, design, build, and test, a balloon lifted, wind powered, air compressor, compressed air storage, and air powered electrical generation system to be deployed at 1,000 feet above the ground for increased energy production.
Role: Project manager and faculty mentor for undergraduate research students.

Energy Dynamics Lab, Utah State University Research Foundation, 2010-2012
Utah Science Technology and Research (USTAR)
Algae-to-Biofuels
This project was to demonstrate commercially viable, large-scale, low cost, open-pond algal cultivation, harvesting, and biofuels production.
Role: Program Manager

Energy Dynamics Lab, Utah State University Research Foundation, 2010-2012
Department of Energy, National Renewable Energy Lab
Beneficial Reuse of Carbon Dioxide with Algae
This project was to demonstrate pilot-scale, algae cultivation for the capture of carbon dioxide from flue gas and/or air.
Role: Program Manager

Energy Dynamics Lab, Utah State University Research Foundation, 2011-2012
Uintah Basin Impact Mitigation Special Service District
Algae for Waste Water Mitigation
This project was to demonstrate scaled, low cost, open-pond algal cultivation to reduce impacts from fossil energy production in Eastern Utah.
Role: Program Manager

Energy Dynamics Lab, Utah State University Research Foundation, 2010-2012
Department of Energy, National Renewable Energy Lab
Algae Energy Systems
This project was to demonstrate smale-scale, low cost, open-pond algal cultivation for biomass feedstock.
Role: Program Manager

Energy Dynamics Lab, Utah State University Research Foundation, 2010-2011
Department of Energy, National Renewable Energy Lab - subcontract from Utah State University
Light Optimization of Algal Cultures - subcontract
This research and development project was to measure algal growth as a function of incident light wavelength.
Role: Program Manager

Energy Dynamics Lab, Utah State University Research Foundation, 2010
Phyco2, LLC
Verification of Phyco2 algal growth system
This project was to verify $CO_2$ capture rates of the Phyco2 algal photobioreactor.
Role: Program Manager

Mountain West Energy, LLC, 2008
Mountain West Energy
In-situ vapor extraction (IVE) enhanced oil recovery (EOR) for additional oil production from stripper wells.
This project was to design, develop, and test a novel hot gas injection process (IVE) using MWE's proprietary well-within-a-well, single well, injection-production configuration. It was carried out at the Teapot Dome oilfield, National Petroleum Reserve #3 in cooperation with the Federal, Rocky Mountain Oilfield Testing Center (RMOTC). IVE produces additional oil from depleted stripper oil wells by injecting hot gas into the top of the oil formation, where it heats and vaporizes the oil

trapped in the pores of the rock., releasing it. The vaporized oil condenses back into a liquid at the bottom of the hot zone and flows down to the bottom of the formation where it is produced from the well.

Synexus Technology, LLC, 2006
Synexus Technology, LLC
Fully integrated, hydrogen fuel cell and hydrogen source.
This project successfully developed a commercial, fully integrated, closed cathode, air cooled, hydrogen fuel cell and water activated, chemical hydride, hydrogen source (HydroCell).

Trulite Technology, LLC, 2003
Department of Defense, Air Force
Lightweight hydrogen generator for hydrogen fuel cells
This project was a Phase 1 SBIR to demonstrate a lightweight hydrogen generator developed by Trulite.
Role: PI

Trulite Technology, LLC, 2002
Department of Defense, Defense Threat Reduction Agency (DTRA)
Lightweight hydrogen generator for hydrogen fuel cells
This project was a Phase 1 SBIR to demonstrate a lightweight hydrogen generator developed by Trulite.
Role: PI

MOXTEK, Inc., 1997
Department of Defense, Army
Single crystal tungsten penetrators
This project was a Phase 1 SBIR to produce single crystal tungsten penetrators by plasma Czochralski crystal growth technique developed at MOXTEK.
Role: PI

MOXTEK, Inc., 1996
Department of Defense, Army
Single crystal quartz resonators by atomic layer epitaxy
This project was a Phase 1 SBIR to produce single crystal quartz resonators by atomic layer epitaxy.
Role: PI

MOXTEK, Inc., 1996
National Science Foundation
X-ray mirrors by atomic layer epitaxy
This project was a Phase 2 SBIR to produce x-ray mirrors by atomic layer epitaxy.
Role: PI

## Service

**Utah Valley University**
Department RTP committee
College Scholarship committee
Sustainability Committee
UVU Prep Academy Chemistry Instructor
Faculty Excellence Award Committee

Annual Dean's Day
Hiring Committee for the Analytical Chemistry Faculty Position
Hiring Committee for the General Chemistry and Lab Director Lecturer Position
Hiring Committee for the Biochemistry Lecturer Position
Hiring Committee Chair for the Chemical Hygiene and Safety Position
Hiring Committee Chair for the Central Stockroom Manager Position
Textbook Review Committees

**Community Outreach**
Chemistry Magic Show Northridge Elementary Parents Night
Annual Chemistry Department Magic Show
Annual Orem City Library Chemistry Magic Show
UVU Family Fun Fair
Sterling Scholar Judge
Chemistry Club Pie Your Professor
PhD Committee Member University of Utah

## Honors and Awards

2021 College of Science Dean's Award of Excellence for Scholarship
2010 Grow Utah Ventures Concept-to-Company Runner-up awarded to Mountain West Energy
2008 Utah Innovation Award recipient for Energy and Cleantech awarded to Mountain West Energy
$100,000 SBIR award recipient in 2003 from the US Air Force to develop lightweight hydrogen generators
$100,000 SBIR award recipient in 2002 from the Defense Threat Reduction Agency to develop compact, lightweight hydrogen generators
2nd place award winner in 2001 Utah Entrepreneur Challenge statewide business plan competition
US patent pending for membrane controlled chemical hydride hydrogen generator
$100,000 SBIR award from the Department of Defense to develop single-crystal tungsten bullets
$100,000 SBIR award from the Department of Defense to develop quartz resonators using atomic layer epitaxy
"Best Dissertation" in 1994 for the College of Physical and Mathematical Sciences at Brigham Young University from Sigma Xi, the Scientific Research Society
$250,000 SBIR award from the National Science Foundation to develop x-ray mirrors using atomic layer epitaxy
1990-91 Loren C. and Maurine F. Bryner Graduate Fellowship for outstanding scholarship and achievement in graduate research at Brigham Young University
First place for excellent research presentation at the 1990 Spring Research Conference at Brigham Young University

## Other Experience and Professional Memberships

Member, American Chemical Society, 1994-1998 and 2012 - present
Member, Society of Petroleum Engineers, 2005-2012
Member, Algal Biomass Organization, 2010-2012