



Peter J. Schubert

Electrical Engineering Consultant, Solution Engineering Group

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MISSION: Comprehensive integrated sustainable energy systems for all

EDUCATION & LICENSE

P.E. Microelectronics – Electrical Engineering, **State of Illinois** (062.061746) 2009
Ph.D. Electrical and Computer Engineering, **Purdue University** 1990
General Motors Fellow
M.S. Electrical Engineering, **University of Cincinnati** 1984
Whirlpool Fellow
B.A. Physics, **Washington University**, St. Louis 1982

ACADEMIC & ADMINISTRATIVE APPOINTMENTS

Director, Richard G. Lugar Center for Renewable Energy 2011-
www.lugarenergycenter.org
Professor, Electrical and Computer Engineering, IUPUI 2011-
<http://enr.iupui.edu/main/people/detail.php?id=pjschube>

PROFESSIONAL EXPERIENCE & ENTREPRENEURSHIP

CEO, **Green Fortress Engineering, Inc.**, Greensburg, Indiana 2016-
Self-Sufficiency Solutions www.greenfortressengineering.com
Principal, **Schubert Solutions, LLC**, Indianapolis, Indiana 2011-2017
Engineering consulting www.schubertsolutionsllc.com
Managing Director, **Biomass Unit Ops, LLC**, Indianapolis, IN 2011-2016
Thermochemical conversion www.biomassunitops.com

Managing Director, Hydrogen Sponge , LLC, Indianapolis, IN	2011-
2016 Energy storage www.hydrogensponge.com	
Senior Director, Packer Engineering , Inc., Naperville, Illinois	2006-2011
Engineering consulting and research	
Technical Fellow, Delphi Electronics & Safety , Kokomo, IN	1984-2006
Research Assistant, McDonnell Space Science Lab , Washington University	1981

RECOGNITION, AWARDS, CERTIFICATIONS

Second Place, International SunSat Design Competition , Ohio University Foundation and Space Canada, presented at the 35 th International Space Development Conference, San Juan, Puerto Rico. Mentored a student team on “Pathway to Power”	2016
Hall of Fame, Kent Roosevelt High School , Kent, Ohio	2016
Fulbright Specialist, University of Malta	2014
Renewable energy, Waste-to-Energy	
Excellence in Oral Presentation, Society of Automotive Engineers	2006
Manufacturing Excellence Award, Nat’l Center for Appropriate Technology	2004
Rollover sensor for Light Armored Vehicle (LAV-25)	
Best Presentation, dSPACE User Conference	2004
Autocode for automotive applications	
Design for Six Sigma Green Belt, Advanced Innovative Technologies Group	2004
SE-1 Systems Engineering Certification, Delphi Delco Electronics Systems	2003
LEAD Award, Delphi Electronics & Safety	2001
Modular algorithms using engineers from low-cost (international) sites	
Donald J. Almquist Award, Delphi Electronics & Safety	1999
Supercomputer design and automated airbag calibration tool	
Delphi Innovation Hall of Fame, Delphi Corporation	1997
Effective Negotiating Skills, General Physics Corporation	1997
Quality Engineering III, Quality Engineering IV, Delco Electronics	1992
Electrochemical Technology, Case Western Reserve University	1992

RESEARCH GRANTS

\$225,000	National Science Foundation STTR Phase I “Hydrogen Storage in Catalytically-Modified Porous Silicon,” number 1648748, 1 Jan 2017 to
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	31 Jan 2018 to Green Fortress Engineering, Inc., Schubert as CEO, having IUPUI as subcontractor (\$134,226) with Schubert as PI.	
\$50,000	Indiana Economic Development Corporation, matching funds for NSF STTR, number 419218, executed 27 Feb 2017 to Green Fortress Engineering, Inc.	
\$13,000	Empower Earth, Inc. “Wireless Power Transfer” 22 Dec. 2017.	
\$1,750	Erasmus+ (EU) travel grant to Newcastle University, Newcastle-upon-Tyne, 6-10 Oct. 2016.	
\$100,000	Aerodyne Combustion (NSF pass-through) STTR Phase I: Wave Rotor Constant-Volume Combustion for Energy Efficiency and Greenhouse Gas Abatement in Gas Turbine Engines, PI	2015-2016
\$600,000	National Science Foundation (NSF), “Electricity from Bio-Ethanol Powered Fuel Cells,” co-PI	2013-2015
\$4,000	Duke Energy and Simon Property Group , “Research study of solar car charging ports with battery storage,” PI	2013
\$2,500	N-Ovations , Savanna, IL, “Renewable fertilizer,” Consultant	2012
\$11,665	U.S. Department of State , Speaker and Specialist Grant to University of Malta	2012
\$1,200,000	U.S. Department of Energy (DOE), Congressionally Directed Project, “Green Fuels Depot,” Technical Leader	2009-2010
\$55,000	National Center for Manufacturing Sciences , “Integrated Shot Counter,” Technical Manager	2010-2011
\$296,000	U.S. Marine Corps (USMC), “M240 Weapons Shots Fired Counter,” Technical Manager	2009-2010
\$196,000	U.S. Department of Energy (DOE), subcontractor to Capstone Turbine Co., “Alternate Fuel Microturbine,” – co-PI	2009-2011
\$125,000	Growth Dimensions (Illinois), “Pyrolytic Biomass CHP,” PI	2009-2010
\$160,000	Department of Commerce and Economic Opportunity (Illinois), “Pyrolytic Biomass CHP,” PI	2008-2009
\$1,000,000	U.S. Department of Agriculture (USDA), “Biomass R&D”, PI	2008-2010
\$700,000	National Aeronautics and Space Administration (NASA), “Extraction of Oxygen and Silicon from Lunar Regolith using only Solar Power,” SBIR Phase I and Phase II	2007, 2009-2011
\$24,000	U.S. General Services Administration (GSA), “Laser Scanning of Federal Buildings,” PI	2006-2007

\$88,000 **Edison Materials Technology Center** (Dayton, OH), “Hydrogen Storage
in Nanoporous Silicon,” PI 2005-2006

DONATIONS RECEIVED

Biomass-to-Energy system, from Argonne National Labs (Argonne, IL), January 2015,
estimated market value \$600,000.

Engine-Generator Set (Genset), from Port Vue Plumbing (McKeesport, PA), March
2014, estimated market value \$4,000.

Waste-to-Energy System, “Old Blue”, from Conversion Energy Systems (Chicago, IL),
July 2012, estimated market value \$500,000.

Hoosier Energy (Bloomington, IN), December 2013, donation of \$10,000

Duke Energy Foundation (Plainfield, IN), June 2014, donation of \$10,000

U.S. Patent 6,668,846 on a Gyroscopically Balanced Walking Cane from Mr. Edward
Meador (Springfield, VA), estimated market value \$5,000.

INTERACTION with ELECTED OFFICIALS

- Visits with State Representatives, Indianapolis, Indiana 2015
 - Private meeting with Dr. A.P.J. Kalam, 11th President of India on the topic of
Space-Based Solar Power 2013
 - Visits with U.S. Senator Richard G. Lugar, Washington, D.C., and Indianapolis,
IN 2011-2012
 - Visits with Indiana Congressional Delegation, Washington, D.C. 2011-2015
 - Testimony on Netmetering, Senate Energy Committee, State of Illinois 2010
 - Visits with Representative Judy Biggert, Washington, D.C. 2008-2011
 - Tour for Senator Richard Durbin, Naperville, IL 2010
 - National Space Society – Moon-Mars Blitz 2002, 2003, 2006, 2007, 2009
Citizen lobbyist on behalf of NASA
 - National Space Society – Chairman of the Washington Legislative Conference,
Washington, D.C. 2003
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TEACHING EXPERIENCE

ECE Capstone Design I, IUPUI, ECE 48700 2017-

ECE Capstone Design II, IUPUI, ECE 48800 2017-

Semiconductor Device Physics , IUPUI, ECE 30500	2014-2017
Fundamentals of Electrical Energy Engineering , IUPUI, ECE 49500	2014-2017
Nanotechnology: Environmental Implications and Solutions , U.S. Department of Energy	2007
Keeping Your Batteries in Shape , Evidence Photographers International Council, School of Evidence Photography & Imaging	2006
Model-Based Design: Delivering Quality Electronics Products Faster , Society of Automotive Engineers, C0806	2008-2012
Occupant and Vehicle Responses in Rollovers , SAE	2004-2006
MATLAB/Simulink/Stateflow as Applied to Executable Specifications , Delphi Electronics & Safety, #24950, 2-day class	2001-2004
Model-Based System Development , Delphi Electronics & Safety, #21244	2002-2004
Finite State Machine Primer , Delphi Electronics & Safety, #30319, delivered to over 750 engineers in 17 countries.	2004

STUDENT MENTORING & SUPERVISION

M.S.	Mitchel Szazynski, “Architectural Studies of Wireless Power Transfer,” IUPUI	2017-
Capstone	Nicholas Miller, Colton Voyles, Christopher Beasley, Caleb Thomas, “Fly or Fry: Wireless Power Transfer to Drones,” ECE 487-488 IUPUI	2017-8
Capstone	Veronica D’Agosta, Alvaro Esperanca, Jonathan Schroeder, Trevor Farkas, “Update of House-made Temperature-Programmed Desorption,” ECE 487-488 IUPUI	2017-8
Capstone	Aalan Miranda, Urvishkumar Patel, Han Shih, Joshua Woodward, “Power and Control using Abandoned Coal Mines for Pumped Hydro Energy Storage,” ECE 487-488 IUPUI	2017-8
Capstone	MaCie’ Moore, Raymond Rummel, Brendan Smith, John Watkins, “Policy Development and Stakeholder Outreach for the use of Abandoned Coal Mines for Pumped Hydro Energy Storage ECE 487-488 IU-Bloomington.	2017-8
CTEE Scholar	Morgan Mitchell, “Brownfield Soil Remediation using Dielectrophoresis,”	2016-
Competition	Joel Najmon, Brayden Ratekin, Bryan Benson, Getsemani Gonzalez, William Gainey, RASC-AL Competition for Cislunar Logistics	2016-2017

Capstone	Adam Clarkson, David Galloway, Mitchel Szazynski, Ali Alsulaiman, "Drone Destroyer," Electrical and Computer Engineering senior capstone project, jointly with NSWC Crane's Dr. Corey Bergsrud	2016-2017
M.S.	Mawla Boaks, "Density Functional Theory Study of Hydrogen Storage in Porous Silicon," IUPUI	2016-
Internships	Mukish Kumar Munyady, Shen Mi Khoo, Khairuz Zaki Md Rujhan, Xiang En Huang, Muhammad Izzuddin Mohd Izam, Syiu Chi Chua, Muhamad Latiff Zainal Abidin, Filarius Peter Usop, Khalil Adli Moktar, Prvinjit Singh, all students of Universiti Tenaga Nasional, Malaysia, Space Solar Power Summer Research Team	2016
Competition	Javier Tandazo, Alexander Carter, John Guggenheim, Brenda Rodriguez, Curtis Waggoner, Garrett Ruble, Andrew Barnhardt, Int'l SunSat Design Competition. Won 2 nd place with \$6,000 purse.	2016
Competition	Wiaam Elkhatib, Andrew Godfrey, Austin Stanforth, Brock Schaffer, Chase Gresgy, Collyn Dodge, Emiliya Akmayeva, Emily Rosales, Fatih Tokmo, George Tipker, Michael Zimmerman, Guy Wiss, Josh Day, Joshua Potts, Kyle Turner, Patrick Proctor, Zach Firks, NASA RASC-AL Competition for 1-G Space Station Design and Budget.	2015-2016
Capstone	Steven Zusack, Nathan McDaniel, Raveena Patil, Chanel Johnson, Sean Lachenman, for RASC-AL Competition for lunar ice mining. One of 12 finalist teams.	2015-2106
Internships	Sheylla Monteiro Pinto, Bruna Caroline Pires, Moises do Nascimento, Edward Barks, Jonathan Nderitu, Gabriel Goncalves, Fatih Tokmo, Space Solar Power Wireless Power Transfer Summer Research Team	2015
Capstone	Heather Tait, Tabitha Truax, Peter Wiggington, Jacleen Joiner, School of Public and Environmental Affairs, IUPUI, "Hope for Hemp"	2015
Capstone	Abdulkarim, Chahal, Felder, Hooker, Magnetta, Mechanical Engineering, IUPUI and Butler University, "High Torque-Density Electric Motor"	2015
M.S.	Drew Witte, "Optimization of Waste to Energy Conversion," ECE Department, IUPUI	2012-2014
Honors	David Vance, "Study of Biochar Production," IUPUI	2014-2016
Capstone	Bales, Darby, Gosewehr, Pryor, Yarbrough, School of Public and Environmental Affairs, IUPUI, "Homegrown Energy"	2014
Internship	Akash Bansal, Indian Institute of Technology-Bombay, "Biochar Production and Marketing"	2014
Capstone	O'Brien, Peed, Ryan, Ong, Zhang, Christopher, Mechanical Engineering, IUPUI and Butler University, "Microchannel Reactor for Direct Gas-to-Liquids Fuel Production"	2014

Advisor	Students for the Exploration and Development of Space, IUPUI	2011-
Capstone	Godfrey, Griswold, Alotaibi, Nicholas, Patterson, Stoery, Mechanical Engineering, IUPUI and Butler University, "Rooftop Garden"	2013
MBA	Dustin Tuescher, Kelly School of Business, IUPUI, "Cost of Ownership for Biomass to Energy Systems"	2014
MBA	Peter Froehlich, Linda Klain, Dustin Tuescher, Daniel Wang, Kelley School of Business, IUPUI, "Stalk Stoker Monetization"	2013
Research	Daniel Reyzman, Thomas Watkins, IUPUI, "Boiler MACT for Indiana", co-sponsored by the Hoosier Environmental Council and the IUPUI Solution Center Venture Fund	2013
Internship	Mathur, Kaushal, Jaithaliya, Indian Institute of Technology-Bombay, "Biomass Gasification"	2013
Capstone	Mechanical Engineering, IUPUI, Jing, Sargent, Lyenaki, Tran, Hertic, "Green Garage Microgrid"	2013
Research	Innovation to Enterprise Central, IUPUI, Cambridge, Lothamer, Blankenship, "Energy Bootstrapping for Rural Villages"	2012
Research	Joshua Cisney, School of Public and Environmental Affairs, Indiana University, "Energy Policy Issues in Indiana"	2013
Capstone	Andrew, Chonaiew, Leonard, Meluch, Peeples, School of Public and Environmental Affairs, IUPUI, "Breathable Indy"	2013
Research	Shiva Patibanda, "Wound-Rotor Motor Project," co-sponsored with Mechanical Electrical Systems (Indianapolis, IN)	2013
Research	Sarah Vycas, Library Sciences, IUPUI "Internally-Displaced Persons"	2012
Capstone	Mersinger, Mills, Misry, Julian, Muller, Mechanical Engineering, IUPUI, "Rocket Cane"	2012
Capstone	Baker, Hamag, Kramer, Molinder, Yoder, School of Public and Environmental Affairs, IUPUI, "Smart Farms Indiana"	2012
Research	Will Hammel, Zachary Urbanek, "Solid Oxide Fuel Cell Laboratory Design"	2012
Internships	60 students, high school, college, graduate, Packer Engineering	2006-2011
Internships	70 students, college, Delphi Electronics & Safety	1984-2005

INTELLECTUAL PROPERTY

United States (and European Union)

9,416,326	BIOMASS GASIFICATION/PYROLYSIS SYSTEM AND PROCESS	2016
8,845,772	PROCESS AND SYSTEM FOR SYNGAS PRODUCTION FROM BIOMASS MATERIALS	2014
8,691,115	SYSTEM AND METHOD FOR CONTROLLING CHAR IN BIOMASS REACTORS	2014
8,673,811	SYSTEM, METHODS AND MATERIALS FOR STORING AND RETRIEVING HYDROGEN	2014
8,518,856	SOLID-STATE HYDROGEN STORAGE MEDIA AND CATALYTIC HYDROGEN RECHARGING THEREOF	2013
8,465,562	SCALABLE BIOMASS REACTOR AND METHOD	2013
8,046,946	SHOT-COUNTING DEVICE FOR A FIREARM	2011
7,935,176	OXYGEN EXTRACTION APPARATUS AND PROCESS	2011
7,833,428	PROCESSES AND APPARATUS FOR PRODUCING POROUS MATERIALS	2010
7,721,601	HYDROGEN STORAGE TANK AND METHOD OF USING	2010
7,512,461	VEHICLE ROLLOVER SENSING USING ANGULAR ACCELEROMETER	2009
7,477,972	(also EP 1,749,722) ROLLOVER WARNING AND DETECTION METHOD FOR TRANSPORT VEHICLES	2009
7,462,820	ISOTOPE SEPARATION PROCESS AND APPARATUS THEREFOR	2008
7,412,314	SOIL TRIP VEHICLE ROLLOVER DETECTION METHOD	2008
7,403,848	VEHICLE ROLLOVER DETECTION SYSTEM	2008
7,294,926	(also EP 1,768,179) CHIP COOLING SYSTEM	2007
7,269,483	(also EP 1,628,180) MULTIPLE ALGORITHM EVENT DISCRIMINATION METHOD	2007
7,206,679	(also EP 1,552,987) RECONFIGURABLE METHODOLOGY FOR EVENT DETECTION IN A MOTOR VEHICLE	2007
7,162,340	(also EP 1,552,989) VEHICLE ROLLOVER DETECTION AND METHOD OF ANTICIPATING VEHICLE ROLLOVER	2007

7,143,658	DEFLECTION PLATE WEIGHT SENSOR FOR VEHICLE SEAT	2006
7,118,075	SYSTEM AND METHOD FOR ATTITUDE CONTROL AND STATION KEEPING	2006
7,000,948	(also EP 1,533,194) INTERNALLY-TETHERED SEAT BLADDER FOR OCCUPANT WEIGHT ESTIMATION	2006
6,994,296	APPARATUS AND METHOD FOR MANUEVERING OBJECTS IN A LOW/ZERO GRAVITY ENVIRONMENT	2006
6,930,304	PROCESS AND APPARATUS FOR ISOTOPE SEPARATION IN A LOW-GRAVITY ENVIRONMENT	2005
6,850,825	METHOD FOR SUPPRESSING DEPLOYMENT OF AN INFLATABLE RESTRAINT BASED ON SENSED OCCUPANT WEIGHT	2005
6,818,842	SEAT FOAM HUMIDITY COMPENSATION FOR VEHICLE SEAT OCCUPANT WEIGHT DETECTION SYSTEM	2004
6,714,848	(also EP 1,312,515) ADAPTIVE ROLLOVER DETECTION APPARATUS AND METHOD	2004
6,654,671	ROLLOVER DETECTION ALGORITHM WITH OCCUPANT MOTION ANTICIPATION	2003
6,614,018	PROCESS AND APARATUS FOR CONTINUOUS-FEED ALL-ISOTOPE SEPARATION IN MICROGRAVITY USING SOLAR POWER	2004
6,584,388	ADAPTIVE ROLLOVER DETECTION APPARATUS AND METHOD	2003
6,542,792	(also EP 1,754,633) VEHICLE ROLLOVER DETECTION APPARATUS AND METHOD	2003
6,356,854	HOLOGRAPHIC OBJECT POSITION AND TYPE SENSING SYSTEM	2002
5,721,162	ALL-SILICON MONOLITHIC MOTION SENSOR WITH INTEGRATED CONDITIONING CIRCUIT	1998
4,948,456	CONFINED LATERAL SELECTIVE EPITAXIAL GROWTH	1990
4,885,618	INSULATED GATE FET HAVING A BURIED INSULATING BARRIER	1989
4,797,718	SELF-ALIGNED SILICON MOS DEVICE	1989
4,760,036	A PROCESS FOR GROWING SILICON-ON-INSULATOR WAFERS USING LATERAL EPITAXIAL GROWTH WITH SEED WINDOW INSULATION	1988

4,758,530	DOUBLY-SELF ALIGNED HOLE-WITHIN-A-HOLE STRUCTURE IN SEMICONDUCTOR FABRICATION	1988
Schubert, P., "Doubly-Self-Aligned Hole-Within-a-Hole Structure in Semiconductor Fabrication Involving a Double LOCOS Process Aligned with Sidewall Spacers," U.S. Patent number: 4,758,530.		
4,749,441	SEMICONDUCTOR MUSHROOM STRUCTURE FABRICATION	1988
4,716,128	METHOD OF FABRICATING SILICON-ON-INSULATOR LIKE DEVICES	1987
4,714,685	METHOD OF FABRICATING SELF-ALIGNED SILICON-ON-INSULATOR LIKE DEVICES	1987
<u>European Union</u>		
1,906,343	Method of developing a classifier using adaboost-over-genetic programming	2008
1,870,838	Contour-based object recognition method for a monocular vision system	2007
1,690,748	Vehicle rollover detection method based on differential Z-axis acceleration	2005
1,688,315	Method of producing a rollover arming signal based on off-axis acceleration	2006
1,637,407	Vehicle rollover detection method	2006

PUBLICATIONS & PRESENTATIONS

Book Chapters

Schubert, P., Urbanek, A, "Hydrogen Recharge Dynamics and Vessel Design for Porous Silicon Storage Media," in Ch. 6 of Nanotechnology 2014: Electronics, Manufacturing, Environment, Energy & Water, vol. 3, CRC Press, ISBN 9781482258301, pp. 418-422, 2014.

Schubert, P., Fu, Y., "Seawater Flow Battery as Technology Platform," in Ch. 6 of Nanotechnology 2014: Electronics, Manufacturing, Environment, Energy & Water, vol. 3, CRC Press, ISBN 9781482258301, pp. 446-449, 2014.

Schubert, P., Paganessi, J., Wilks, A., Murray, M., "Distributed Hydrogen Generation and Storage from Biomass," Materials Challenges in Alternative and Renewable Energy II, J. Wiley, Wicks, G., Simon, J., et al., Eds. V. 239, 2012.

- Schubert, P.** “Materials Selection and Processing for Lunar Based Space Solar Power,” Materials Challenges in Alternative and Renewable Energy, J. Wiley, Hoboken, NJ, v. 224, 2011.
- Schubert, P.,** Wilks, A., “Thermodynamic analysis of a novel hydrogen storage material: nanoporous silicon,” Materials Innovations in an Emerging Hydrogen Economy, G.G. Wicks, J. Simon, Ceramics Transactions v. 202, Eds., J.Wiley, 2009.
- Schubert, P.,** Vitkin, L., Braun, D., “Model-based development for event-driven applications using MATLAB: Audio Playback case study”, in SAE Transactions – Journal of Fuels and Lubricants, Society of Automotive Engineers, 2008.
- Schubert, P.,** Vitkin, L., Winters, F., “Executable Specs: What makes one, and how are they used?” in SAE Transactions Journal of Passenger Cars – Electronic and Electrical Systems, Society of Automotive Engineers, 2006.
- Schubert, P.,** Saxena, R., Pinagapani, S., Gopal, M., “Math-Based Design of Sensing Bladders”, in SAE Transactions Journal of Passenger Cars – Mechanical Systems, Society of Automotive Engineers, 2006.
- Schubert, P.,** Nichols, D., Wallner, E., Kong, H., Schiffmann, J.K., “Electronics and Algorithms for Rollover Sensing” in Occupant and Vehicle Responses in Rollovers, Viano, D.C., and Parenteau, C.S., eds., Society of Automotive Engineers, 2004.
- Schubert, P.,** “Robust Automated Airbag Module Calibration”, in SAE Transactions – Journal of Passenger Cars – Mechanical Systems , Society of Automotive Engineers, 2002.

Journal Articles

- Schubert, P.,** “Distributed Bio-Hydrogen Refueling Stations,” J. Earth Sci. and Eng., v. 6., no. 4, April 2016, pp 183-190.
- Schubert, P.,** “Renewable Energy for Human Sustainability,” Environmental Science, Oxford Research Encyclopedias, Apr. 2016, 10.1093/acrefore/9780199389414.013.18
- Schubert, P.,** Neudeck, G., “Vertical Bipolar Transistors Fabricated in Local-Silicon On Insulator Films Prepared Using Confined Lateral Selective Epitaxial Growth”, IEEE Trans. Elec. Devices, v. 27, 1990.
- Neudeck, G., **Schubert, P.,** Glenn, J., Friedrich, H., Klaasen, W., Zingg, R., Denton, J., “Three-Dimensional Devices Fabricated by Silicon Epitaxial Lateral Overgrowth” J. Electronics Mat’ls., v. 19, 1990.
- Schubert, P.,** Neudeck, G., “Confined Lateral Epitaxial Growth of Silicon for Device Fabrication,” IEE Electron Device Letters, v. 11, 1990.
- Schubert, P.,** Nevin, J., “A Polyimide-Based Capacitive Humidity Sensor,” IEEE Trans. Elec. Devices, v. ED-32, 1985.

Fraundorf, P., Lyons, T., **Schubert, P.**, “The Survival of Solar Flare Tracks in Interplanetary Dust Silicates on Deceleration in the Earth’s Atmosphere,” J. Geophysical Research, v. 87, 1982.

Conference Papers, Magazines & Presentations

Schubert, P., Moktar, K.A., Huang, X.E., Izam, M.I.M., “Metal Alloys for Additive Manufacturing plus Silicon and Oxygen from Regolity,” Int’l. Astro. Conf. 2016 poster IAC-16.A3.IP.27x32325, 28 Sept. 2016.

Schubert, P.J., , “Sidelobe Reduction for GEO to Earth Wireless Power Transfer,” Int’l. Astro. Conf. 2016, Guadalajara, Jalisco, Mexico, 26-29 Sept 2016.

Schubert, P.J., Mukish Kumar Munyady, Shen Mi Khoo, Pravinjit Singh, “Assembly and Operation of a “Tin Can” SPS,” Int’l. Astro. Conf. 2016, Guadalajara, Jalisco, Mexico, 26-29 Sept 2016.

Schubert, P.J., Khairuz Zaki Md Rujhan, Filarius Peter Usop, Muhamad Latiff Zainal Abidin, Syiu Chi Chua, “Sea-Based Rectennae for Earth and Titan,” Int’l. Astro. Conf. 2016, Guadalajara, Jalisco, Mexico, 26-29 Sept 2016.

Zusack, S.A., Patil, R., Lachenman, S., Johnson, C.A., **Schubert, P.J.**, McDaniel, N., “Capstone Design Project Experience: Lunar Ice Extraction Design,” Proceedings of American Society of Engineering Educators, Annual Conference, New Orleans, 23-26 June 2016.

Elkhatib, W., Zusack, S.A., **Schubert, P.J.**, Schaffer, B., Akmayeva, E.V., Proctor, P.J., Wiss, G.N., “Problem-based Multidisciplinary Participation in Aerospace Design,” Proceedings of American Society of Engineering Educators, Annual Conference, New Orleans, 23-26 June 2016.

Schubert, P.J., “Mentored, Unpaid Design Team Internship Experience,” Proceedings of American Society of Engineering Educators, Annual Conference, New Orleans, 23-26 June 2016.

Schubert, P.J., “Silicon Carbide from Asteroids for Power Electronics,” Int’l. Space Development Conf., San Juan, PR, 18-22 May 2016.

Schubert, P.J., “Doubly Self-Aligned DMOSFET in SiC for Microgravity Manufacture,” Poster session, CS ManTech 2016, Miami, FL, 16-19 May 2016.

Schubert, P.J., “Seawater Flow Battery for Clean Cold-ironing & Fleet Vehicle Fueling,” Energy, Utility & Environmental Conference 2016, San Diego, 3-5 Feb 2016.

McIver, Ann W., and **Schubert, P.J.**, “Research and Commercialization of Renewable Technologies to Support Remediation,” Energy, Utility & Environmental Conference 2016, San Diego, 3-5 Feb 2016.

Schubert, P.J., “Distributed Bio-Hydrogen Refueling Stations,” Energy, Utility & Environmental Conference 2016, San Diego, 3-5 Feb 2016.

- Schubert, P.J.**, Pinto, S.M., Pires, B.C., do Nascimento, M., Barks, E., Nderitu, J., Goncalves, G., Tokmo, F., “Analysis of a Novel SPS Configuration Enabled by Lunar ISRU,” Proceedings AIAA SPACE 2015, Pasadena, CA, 31 Aug. – 2 Sept. 2015.
- Schubert, P.**, “Selection and Re-Selection in Stochastic Democracy,” Proceedings AIAA SPACE 2015, Pasadena, CA, 31 Aug. – 2 Sept. 2015.
- Elkhatib, W.Y., **Schubert, P.J.**, Zusack, S.A., Rosales, E.C., Stanforth, A.C., “Solar Panel Efficacy vs. Altitude in an Urban Environment,” ASEE Annual Conference 2015, 14-17 June 2015, Seattle, WA
- Schubert, P.**, “Energy Resources Beyond Earth – SSP from ISRU,” Gateway-to-Space 2014, St. Louis, MO, Nov 7-9, 2014.
- Schubert, P.**, “Energy Storage for Renewable Generation,” Indiana Conf. on Energy Mgmt, Indianapolis, IN, 13 Aug 2014.
- Schubert, P.**, “Hydrogen Research,” Nat’l. Governors Association, Workshop on Advanced Vehicle Technologies and Infrastructure,” Indianapolis, IN 19May 2014.
- Schubert, P.**, Witte, D., “Analysis of a Gasification Plus Oxidation (GPOX) MSW Volume Reduction System”, Int’l Thermal Treatment Technologies, San Antonio, TX 20-23 Oct. 2013.
- Witte, D., Kaushal, M., Jaithaliya, A., Mathur, A., **Schubert, P.**, “Scalable Hydrogen Production from Biomass”, World Hydrogen Technologies, Conf., Shanghai, 25-28 Sept. 2013.
- Schubert, P.**, Babcock, J., “Advances in Synthesis of Porous Silicon for Hydrogen Storage,” World Hydrogen Technologies, Conf., Shanghai, 25-28 Sept. 2013.
- Schubert, P.**, Wilks, A., “Hydrogen and Hydrogen Storage Media from Rice Hulls,” World Hydrogen Technologies, Conf., Shanghai, 25-28 Sept. 2013.
- Schubert, P.**, “Start-up and Scale-up of a Novel Form of Colony Governance,” AIAA Space 2013, San Diego, 9-11 Sept 2013.
- Witte, D., **Schubert, P.**, “Optimization of a Municipal Solid Waste (MSW) to Energy System,” ASEE Annual Conference and Expo, Atlanta, GA 24-26 June 2013.
- Schubert, P.**, “Creating and Managing a Nationwide Student Movement,” ASEE Annual Conference and Expo, Atlanta, GA 24-26 June 2013.
- Schubert, P.**, Zusack, S., “How Close to Space Before Nobody Can Hear You Scream,” ASEE Annual Conference and Expo, Atlanta, GA 24-26 June 2013.
- Schubert, P.**, Paganessi, J., Wilks, A., Murray, M., “Distributed Hydrogen Generation and Storage from Biomass,” Matls Challenges in Alt. and Renew. Energy, Clearwater, FL 26 Feb-1 Mar, 2012.

- Schubert, P.,** Williams, J., Wilks, A., Ende, M., Babcock, J., Meno, J., “Large Thoria Castings for Ultra-high Temperature Processing with Oxygen,” USACA 34th Annual Conference on Composites, Materials & Structures (ITAR restricted) 23-26 Jan 2012.
- Schubert, P.,** “Dual Use Technologies for Self-Sufficient Settlements: From the Ground Up,” Intl Space Development Conf., Huntsville, AL, 19-22 May, 2011.
- Schubert, P.,** Meno, J., “Oxygen Extraction from Lunar Regolith via Free-Fall Induction Heating,” Intl Space Development Conf. Huntsville, AL, 19-22 May, 2011.
- Schubert, P.,** Williams, J., Bundorf, T., Di Sciullo-Jones, A., “Advances in Extraction of Oxygen and Silicon from Lunar Regolith,” AIAA SPACE 2010, Anaheim, CA, 30 Aug -2 Sept 2010.
- Schubert, P.,** “Costs, Organization, and Roadmap for SSP,” Online Journal of Space Communications, no. 16, 2010.
- Dietzler, D., and **Schubert, P.** “Electrical Energy Storage using only Lunar Materials,” Space Manufacturing 14: Critical Technologies, San Jose, CA, 2010.
- Schubert, P.,** “A Novel System of Governance for Remote Communities,” AIAA SPACE 2010, Anaheim, CA 30 Aug -2 Sept 2010.
- Schubert, P.,** “Solar Panels from Lunar Regolith,” Int’l. Space Development Conf., Chicago, IL, 28-31 May 2010.
- Schubert, P.,** “Materials Selection and Processing for Lunar based Space Solar Power,” Materials Challenges for Energy, Cocoa Beach, FL, 21-24 Feb, 2010.
- Schubert, P.,** “Development and Commercialization of Small-Scale CHP,” Annual Renewable Energy and Advanced Biofuels Summit, Madison, WI, 26 Jan 2010.
- Schubert, P.,** “A Novel System of Governance for Remote Communities,” *Habitation*, no. 1, v. 12, 2009.
- Schubert, P.,** “Removing Crop Residues without Hurting Soil,” *Biomass Magazine*, v.3, no. 11, Nov. 2009.
- Schubert, P.,** “Energy and Mass Balance for a Cislunar Architecture supporting SSP,” AIAA SPACE 09, Pasadena, CA, 14-17 Sept 2009.
- Cunzeman, K., and **Schubert, P.,** “Survey of Ultra-High Temperature Materials for Applications Above 2000 K,” AIAA SPACE 09, Pasadena, CA, 14-17 Sept 2009.
- Schubert, P.,** Simpson, N., Lin, M., “Technical Feasibility of a Novel Method for Station Keeping,” AIAA SPACE 09, Pasadena, CA, 14-17 Sept 2009.
- Schubert, P.,** “Developments in farm-scale pyrolysis of agricultural residues for heat, power, and fertilizer,” American Institute of Chemical Engineers, Midwest Regional Symposium 2008, Chicago, IL, 22-23 September 2008.

- Card, J., **Schubert, P.**, “Bootstrapping Space-based Manufacturing from a Deep Gravity Well,” Int’l. Space Development Conf., Orlando, FL, 28-31 May 2009.
- Schubert, P.**, Pareek, M., “Mass and Moisture Monitoring of Biomass Feedstocks for Gasification,” Int’l. Biomass Conference & Expo, Portland, OR, 29 April 2009.
- Schubert, P.**, “Plasma Torch for Biomass Pyrolysis,” Am. Soc. of Engineering Educators, Annual Conference, Pittsburgh, PA, June 2008.
- Schubert, P.**, Beatty, M., “Harvesting of Lunar Iron: Competitive Hands-on Learning,” Am. Soc. of Engineering Educators, Annual Conference, Pittsburgh, PA, June 2008.
- Schubert, P.**, Cunzeman, K., “Ultra-High Temperature Materials for Lunar Processing,” Am. Soc. of Engineering Educators, Annual Conference, Pittsburgh, PA, June 2008.
- Schubert, P.**, “Hydrogen Storage using Nanoporous Silicon,” *Fuel Cell Magazine*, Feb/Mar 2008.
- Schubert, P.**, Wilks, A., “Thermodynamics of a Novel Hydrogen Storage Media: Nanoporous Silicon,” Materials Innovations in an Emerging Hydrogen Economy (Hydrogen ’08), Cocoa Beach, FL, 24-27 Feb 2008.
- Schubert, P.**, Vitkin, L., Braun, D., “Audio Playback Control Development,” *dSPACE News*, no. 3, 2007.
- Schubert, P.**, “Hydrogen Storage using Nanoporous Silicon,” National Nano Engineering Conference, Boston, MA, 14-15 Nov 2007.
- Schubert, P.**, “A Novel Means for ISRU Oxygen Production,” Space Resources Roundtable IX, Golden, CO, 25-27 Oct 2007.
- Schubert, P.**, “Oxygen Separation from Lunar Regolith,” 23rd Int’l Conf. on Environmental Systems, Chicago, IL, 9-12 July 2007.
- Duncan, S., **Schubert, P.**, Delaurentis, D., “System for Electromagnetic Capture of Lunar-launched Payloads into GEO,” 43rd AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Cincinnati, OH 8-11 July 2007.
- Schubert, P.**, “Self-sustaining and Culturally-adaptive STEM Training Tool,” Am. Soc. Engr. Ed. IL-IN Section Conference, 30-31 March, 2007.
- Schubert, P.**, Vitkin, L., Braun, D., “Model-based development for event-driven applications using MATLAB: Audio Playback case study,” SAE World Congress, 2007, Detroit, MI.
- Schubert, P.**, Vitkin, L., Winters, F., “Executable Specs: What makes one, and how are they used?” SAE World Congress, 2006, Detroit, MI.
- Schubert, P.**, Saxena, R., Pinagapani, S, Gopal, M., “Math-Based Design of Sensing Bladders,” SAE World Congress 2006, Detroit, MI (*Selected by Delphi Electronics & Safety for the Technical Publicity Award for 2006*).

- Schubert, P.**, “Real World Rollovers Reconstructed from Interviews and Measurements,” SAE World Congress 2006, Detroit, MI.
- Schubert, P.**, “Synergistic Construction Mechanisms for Habitats in Space Environs,” Int’l. Space Development Conference 2006, Los Angeles, CA 2006.
- Schubert, P.**, “Surviving a Vehicle Rollover,” *dSPACE News*, no. 1, 2005.
- Schubert, P.**, “A Novel Method for Element Beneficiation Applied to Solar Panel Production,” Space Exploration 2005, Albuquerque, NM.
- Schubert, P.**, “Design and Implementation of a Rollover Algorithm in Production,” DSPACE User Conference, Novi, MI 2004 (*awarded Best Presentation*).
- Schubert, P.**, Nichols, D., Wallner, E., Kong, H., Schiffmann, J., “Electronics and Algorithms for Rollover Sensing,” SAE World Congress 2005, Detroit, MI.
- Schubert, P.**, “Robust Automated Airbag Module Calibration,” SAE World Congress 2001, Detroit, MI.
- Schubert, P.**, Laughlin, D., “Exploring Hybrid Genetic Algorithm Approaches for Airbag Calibrations,” Fourth World Multiconference on Systemics, Cybernetics and Informatics, Orlando, FL., 23-26 July, 2000.
- Schubert, P.**, Sangunetti, D., Chen, J., “Automated Feature Extraction for Linear Pattern Recognition,” EuroGen 99, Jyvaskyyla, Finland, 2009.
- Schubert, P.**, Loughlin, D., “Efficient Optimization of Large k Real-time Control Algorithm,” Seventh International Workshop on Artificial Intelligence and Statistics, Ft. Lauderdale, FL, 1999.
- Schubert, P.**, “Implementation of MEMS in High Volume Production,” SPIE NIST MEMS Conference, Austin, TX, 1995.
- Neudeck, G., Klaasen, W., Siekkinen, J., Duey, S., **Schubert, P.**, “Selective and Lateral Epitaxial Growth Technologies Applied to Silicon Bipolar Transistors,” Semiconductor Research Corp. TECHCON ’88, 1988.
- Schubert, P.**, Klaasen, W., Siekkinen, J., Duey, S., Neudeck, G., “Fabrication Results of a Silicon Epitaxial Lateral Overgrowth Bipolar Transistor Without a Buried Collector,” IEEE International Electron Devices Meeting, Washington, DC, 1987.

INVITED LECTURES

- 17-Aug-16 “Future of Renewables,” Indiana Conference on Energy Management, 17-18 Aug. 2016.
- 22-Jul-16 POWER Camp (High School girls) lecture on Michael Faraday, energy, and space solar power, IUPUI.

- 14-Mar-16 “Pi Day” lectures to 5th graders and to 6th graders at Jonathan Jennings Elementary School (IPS #109) and 7th graders at Decatur Township Middle School, Indianapolis: “How to save the world with energy”.
- 5-Dec-14 Speaker at Purdue University Foundry “Lessons Learned from Startups from Academe, Private, Big Business and Small Business”
- 18-Sep-14 Speaker at Decatur Township Central High School – Indianapolis, IN
- 5-Apr-14 Panelist at Congressional Leadership Day – Indiana District 6, Congressman Luke Messer – Energy for Indiana
- 7-Nov-13 5th Annual Blue Tech Summit – “Promoting Sustainable Development in the Oceans”: - Panelist – San Diego, CA
- 4-Nov-13 Council of Energy Research and Environmental Leaders – “Innovation Ecosystems for Energy Solutions” – Panelist – Argonne National Labs, Illinois.
- 14-Aug-13 “Waste-to-Energy: Two New Technologies for Indiana,” Indiana Conference on Energy Management, Indianapolis, IN.
- 27-Jun-13 IN Focus program WTIU (Bloomington, IN), “Renewable Energy in Indiana”
- 18-Apr-13 “The Future of Energy: Motivations and Solutions for a Better World”, American Chemical Society, Chicago Section, Oakbrook, IL
- 17-Apr-13 “Gasification Plus Oxidation for Energy and Portland Cement” 23rd Annual Solid Waste Technical Conference by the Engineering Society of Detroit, E. Lansing, MI
- 14-Apr-13 “Saving the Planet” at Kent Coterie III, Kent, Ohio
- 8-Dec-12 “Energy Security” at Richard G. Lugar Symposium for Tomorrow’s Leaders
- 7-Dec-12 “The Four Phases of Matter in Renewable Energy”, Lutherwood School, IPS, Indianapolis, IN
- 16-Sep-12 Speech honoring Senator Richard G. Lugar (non-technical), Contemporary Club, Indianapolis, IN
- 14-Sep-12 “Hydrogen Transportation Fuel,” Lugar Collegiate Energy Forum, Purdue University
- 13-Sep-12 “The Ultimate Solution for Renewable Energy,” Physics Colloquium, IUPUI School of Science
- 30-May-12 “Energy, Water & War,” Mid-North Shepherd’s Center, Great Decisions Series.
- 10-May-12 WFYI No Limits. “Greening the Heartland”. Panelist for 1 hour radio program.

- 9-May-12 DOE Hydrogen Fuel Cell Technical Advisory Committee “Research in Fuel Cells and Related Energy Technologies”
- 8-May-12 Keynote speech at IEEE International Electro-Information Technology Conference, IUPUI, 6-8 May, 2012 “When Everything is Electric”
- 22-Apr-12 Radisson Blu Hotel, St. Julians, Malta, Public Lecture: “Renewable Energy Solutions for Every Nation”
- 22-Sep-10 Illinois Counties Solid Waste Management Assoc. annual meeting – “Biomass Thermophysical Conversion”
- 2-May-10 Green Earth Institute Fair 2010 – “Converting Biomass to Electricity, Fertilizer, and Vehicle Fuel”
- 15-Apr-10 SAE World Congress – Keynote speaker – Model-Based Design of Embedded Systems – “Model-Based Design: Evolve or Perish”
- 20-Feb-10 Illinois Space Grant Consortium Symposium – “Oxygen from Regolith Step 1 for Cislunar Architecture”
- 12-Feb-10 Women In Nanotechnology – Nanotechnology overview
- 26-Jan-10 Renewable Energy and Advanced Biofuels Summit – “Development and Commercialization of Small-Scale CHP”
- 20-Nov-09 Illinois Math and Science Partnership, “Real World and Out of This World Applications of basic Math and Science”
- 20-Jun-09 MENSA “Using Moon Rocks to Save the Earth”
- 3-Jun-09 Naperville Intergovernmental Council – “The Green Fuels Depot”
- 29-Apr-09 L5 Society – Oregon , “Using Moon Rocks to Save the Earth”
- 28-Apr-09 IEEE – Oregon, “Alternative Power Generation and Energy Storage”
- 17-Feb-09 College of DuPage – Engineering Club – How Moonrocks Can Save the Earth
- 23-Jan-09 Women In Nanotechnology – Nanotechnology overview
- 10-Nov-08 IIT – IPRO “New Energy Source Systems Development”
- 14-May-08 AiChE – Chicago Chapter – “Using Moon Rocks to Save the Earth”
- 17-Apr-08 NIU Math Dept. “Solving Industrial Challenges with Advanced Mathematics”
- 3-Mar-08 Tech Mgrs Assoc of Chicago, “Bootstrapping an Holistic Alternative Energy Solution”
- 10-Sep-07 Tech Mgrs Assoc of Chicago, “LOX from Rocks Filling the US Moon Base with Air”

7-Apr-97 Institute for Defense Analysis, Alexandria, VA “Microelectrical Mechanical Systems (MEMS) Manufacturing”

EVENT MANAGEMENT

- 15-May-17 Spring Forum by the Lugar Center for Renewable Energy, “Energy, Environment, Economics: “The ThrEEEs”,” 23 speakers, 110 attendees, open to the public, 10 CLE and CEU credits awarded.
- 10-May-16 Spring Forum by the Lugar Center for Renewable Energy, “Building an Energy Security Roadmap,” 21 speakers, 104 attendees, open to the public, 11 CLE and CEU credits awarded.
- 13-May-15 Spring Forum by the Lugar Center for Renewable Energy, “Energy Diversity in Indiana,” 24 speakers, 108 attendees, open to the public, CLE and CEU credits offered.
- 6-May-14 Spring Forum by the Lugar Center for Renewable Energy, “Microgrid Interconnections and Energy Storage,” 15 speakers, 104 attendees, open to the public. Professional credits offered for attorneys.
- 17-May-13 Spring Forum by the Lugar Center for Renewable Energy, “Challenges to Commercialization of Renewable Energy in Indiana,” 18 speakers, 76 attendees, open to the public.
- 18-May-12 Spring Forum by the Lugar Center for Renewable Energy, “Waste to Energy, Chemicals, Fuels, and Heat,” 15 speakers, 103 attendees, open to the public.
- 13-Mar-04 Delphi-wide workshop, “Model-Based Development Tools,” 50 attendees.
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PROFESSIONAL ASSOCIATIONS

- 1984-present Inst. for Electrical and Electronics Engineers – Senior member since 2012.
- 2006-present Society of Automotive Engineers, Senior Member, Instructor since 2004.
- 2008-present Am. Inst. of Aeronautics and Astronautics – Senior member since 2012.
- 2006-present Am. Society of Engineering Educators.
- 2003-present National Space Society
- 2005-present Moon Society
- 1984-2004 Kokomo Engineering Society. Served as Chairman of the Board, President, VP, and Treasurer.
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SERVICE ACTIVITIES

- 2016-present President, Board of Trustees, The Andromeda Movement, Inc.
(<http://www.andromedamovement.org/>)
- 2016-present School of Engineering & Technology, IUPUI, Unit Promotion and Tenure Board
- 2014-present Grievance Board, IUPUI
- 2012-present Primary Committee (promotions & tenure), Electrical and Computer Engineering Department, IUPUI
- 2012-present Lab and Space Committee, Electrical and Computer Engineering Department, School of Engineering & Technology, IUPUI
- 2014 Reviewer – U.S. Dept. of Energy ARPA-E GENSETS FOA
- 2014 Judging Panel – Ball State University (Muncie, IN) MBA Leadership Case
- 2013 Review Board – Vice Chancellor for Research, 5-year evaluation, IUPUI
- 2012-2014 Board of Directors, National Space Society www.nss.org
- 2013 Track Organizer – “Space Solar Power” (4 tracks), Int’l Space Development Conference 2013.
- 2010 Track Organizer – “Space and the Environment,” Int’l. Space Development Conference 2010.
- 2009 Track Co-Organizer – “Dual Use Technologies,” Am. Inst. For Aeronautics and Astronautics, SPACE 2009.
- 2008-present Space Colonization Technical Committee, Am. Inst. For Aeronautics and Astronautics www.aiaa.org
- 2006-2008 Board of Directors, Moon Society, www.moonsociety.org
- 2005-2006 Chairman, Technology Council, Delphi Electronics & Safety
- 2005 Chairman, Executable Specs & Autocode Subgroup, Software Center of Excellence, Delphi Electronics & Safety
- 1993-1995 Leader, Interactive Engineering Team, Delco Electronics, world’s first high-volume micromachined accelerometer for airbag crash sensing.