



The Department of MECHANICAL ENGINEERING


[HOME](#)
[ABOUT US](#)
[NEWS](#)
[EVENTS](#)
[UNDERGRADUATE STUDIES](#)
[GRADUATE STUDIES](#)
[FACULTY & STAFF](#)
[RESEARCH](#)
[ALUMNI](#)
[GIVING](#)
[EMPLOYMENT](#)
[PHOTO GALLERIES](#)
[CANVAS LOGIN](#)
[MAKE A GIFT](#)

[f Mechanical Engineering](#)
[f Undergraduate Studies](#)
[Return to Faculty Directory](#)

Pecht, Michael



George E. Dieter Professor
 Faculty Member, Applied Mathematics and Scientific Computation
 Director, Center for Advanced Life Cycle Engineering
 Department of Mechanical Engineering
 Room S1103, Engineering Lab, (Building 089)
 University of Maryland
 College Park, MD 20742
 Email: pecht@umd.edu
 Phone: 301-405-5323
 Fax: 301-314-9269
[Website](#)

Research Interests

- Machine learning and data analytics
- Li-ion Battery analysis
- Prognostics and health management
- Product characterization and qualification
- Product reliability, risk assessment and mitigation
- Supply chain creation and management

Background

Professor Michael Pecht is the founder of CALCE (Center for Advanced Life Cycle Engineering) at the University of Maryland, which is funded by over 150 of the world's leading electronics companies at more than US\$6M/year. He served as chief editor of the *IEEE Transactions on Reliability* for eight years and on the advisory board of *IEEE Spectrum*. He has written more than twenty books on electronic products development, use and supply chain management and over 400 technical articles. He consults for 22 major international electronics companies, providing expertise in strategic planning, design, test, prognostics, IP and risk assessment of electronic products and systems.

Education

- Ph.D. in Engineering Mechanics from the University of Wisconsin at Madison
- M.S. in Engineering Electrical from the University of Wisconsin at Madison
- B.S. in Physics from University of the Wisconsin at Madison

Honors and Awards

Top most highly cited articles in Microelectronics Reliability for the years 2014, 2015, 2016: Liu, D., P. J. Yue, Z. J. Bao, Y. Peng, and M. Pecht, "Prognostics for State-of-Health Lithium-ion Battery Based on Combination Gaussian Process Functional Regression," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 832-839, June 2013.

IEEE CPMT Technical Field Award (2016)

2015 Applied Energy Award – most highly cited research paper. Xing, Y., W. He, and M. Pecht, "State of Charge Estimation of Lithium-ion Batteries Using the Open-circuit Voltage at Various Ambient Temperatures," *Applied Energy*, Vol. 113, pp. 106-115, Jan. 2014.

Best Student Paper Award of Conference (2016): N. Jordan Jameson, Kai Wang, Carlos Morillo, Michael H. Azarian, and Michael Pecht, "Health Monitoring of Solenoid Valve Electromagnetic Coil Insulation under Thermal Deterioration," *Proceedings of MFPT 2016/ISA's 62nd IIS*, Dayton, OH, May 24-26, 2016.

2016 Chinese Academy of Sciences President's International Fellowship

Best paper award: Fan, J., ChengQian, Fan, X., Zhang, G., and M. Pecht, "In-situ Monitoring and Anomaly Detection for LED Packages Using a Mahalanobis Distance Approach," *The First International Conference on Reliability System Engineering & Prognostics and System Health Management Conference-Beijing* (2015 ICRSE & PHM-Beijing), Beijing, China, October 23, 2015.

Awarded the distinction of "Honorary Professor" by the Harbin Institute of Technology (HIT) in Harbin, China, on July 16, 2015. The Honorary Professor award was granted to Prof Pecht for his technical expertise batteries and for his involvement with HIT in battery research. HIT was established in 1954 and is a member of the prestigious C9 League of Chinese universities. HIT was ranked 10th in the ranking of "Best Global Universities for Engineering" by *U.S. News & World Report* in 2015.

2015 Distinguished Scientist: Chinese Academy of Sciences President's International Fellowship.

IEEE Access was awarded the 2015 PROSE Award winner in the subject category of "Journal/Best New STM (Scientific, Technical, and Medical)." Prof. Pecht is the Editor-in-Chief of IEEE Access. The American Publishers Award for Professional and Scholarly Excellence (PROSE) annually recognize the very best in professional and scholarly publishing by bringing attention to distinguished books, journals, and electronic content. IEEE Access was also a finalist for the Award for Excellence in Physical Sciences and Mathematics.

"Academic Excellence Award" by the Electronics Components Industry Association (ECIA). The award is used to recognize outstanding academic projects 'that reference the application of advanced technologies for passive electronic components'. Peter, Anto, Michael H. Azarian, Michael Pecht, "Step Stress Testing of Electric Double Layer Capacitors," International Capacitor and Resistor Technology Symposium, Santa Clara, CA, April 2014.

2014 Corporate Connector of the Year from the University of Maryland, College Park: The Corporate Connector Award celebrates those individuals or units on campus that do the most to promote and connect UM with the private sector to advance research, partnerships, and scholarship.

4th most cited article in Transactions of the Institute of Measurement and Control over five years (2009 –2014): Pecht, M. and Gu, J., "Physics-of-failure-based Prognostics for Electronic Products," *Trans. of the Institute of Measurement and Control*, Vol. 31, No. 3/4, pp. 309–322, 2009, DOI: 10.1177/0142331208092031

2013: Received gift of \$750k for research into automotive reliability from Hagans, Berman, Sobol, Shapiro LLP

2013 IEEE Educational Activities Board/Standards Association (EAB/SA) Standards Education Award "for continued leadership in developing and promoting standards education in the field of reliability engineering."

2011 – University of Maryland Innovation Award
for his new concepts in prognostics and systems health management.

2010 – IEEE Exceptional Technical Achievement Award

2010 – PMT Society Exceptional Technical Achievement Award
to recognize for exceptional technical achievement in the fields encompassed by the CPMT Society. "Dr. Pecht is recognized world wide for his seminal contributions in the area of electronics reliability from which he has developed a new and significant field of prognostics for electronics. This includes models that enable in-situ assessment of the deviation or degradation of a product from expected normal operating conditions and the prediction of the future state of reliability of that product. Michael's contributions in this area span more than 20 years and his subject matter expertise is disseminated in a book, several book chapters, handbooks, numerous articles, invited talks and short courses presented world wide."

2009 – National Defense Industrial Association award
for CALCE for demonstrating outstanding achievement in the practical application of Systems Engineering principles, promotion of robust systems engineering principles throughout the organization, and effective systems engineering process development.

2009 – University of Maryland Outstanding Faculty Research Award
to recognize research contributions and exceptionally influential research accomplishments by engineering faculty.

2008 – awarded the highest reliability honor, the IEEE Reliability Society's Lifetime Achievement Award

2008 – The Alexander Schwarzkopf Prize for Technological Innovation
awarded to National Science Foundation (NSF) Industry/University Cooperative Research Centers that have had a significant impact on the world. CALCE won the award for its research on physics-of-failure reliability analysis methods and advanced supply chain management concepts for electronic products and systems.

2008 – Best Paper Award
for the 62nd Meeting of the Society for Machinery Failure Prevention Technology. Gu, J., Barker D., and M. Pecht, "Prognostics of Electronics under Vibration Using Acceleration Sensors," Proceeding for 62nd Meeting of the Society for Machinery Failure Prevention Technology (MFPT), Virginia Beach, VA, May 2008, pp. 253–263.

2008 – Maurice Simpson Technical Editors Award

for best 2007 article in IEST. Sony Mathew, Diganta Das, Michael Osterman, Michael Pecht, Robin Ferebee, and Joseph Clayton, for their paper, "Virtual Remaining Life Assessment of Electronic Hardware Subjected to Shock and Random Vibration Life Cycle Loads," Journal of the IEST, Vol. 50, No. 1, pp. 86–97, April 2007.

2008 – Japan Society for the Promotion of Science Fellowship

for research in prognostics in electronics.

IEEE Reliability Society's Lifetime Achievement Award (2007) recognizes Prof. Pecht's long term contributions to the Reliability Society, reliability research, and reliability education, all benefiting the reliability community.

European Micro and Nano-Reliability Award (2007) for outstanding contributions to reliability research.

Distinguished International Service Award (2006) for significant contributions to the development of international institutional programs at the University of Maryland; and a distinguished international career.

Grand Fellowship of the Mirce Academy, England (2005) the highest award that the Academy can bestow upon an individual in recognition of their unique contribution to the understanding and/or predicting of the motion of functionability through system life, at the global level of significance.

IEEE Best Paper of the Year (2004) Award for paper titled "Characterization of Hygroscopic Swelling Behavior of Mold Compounds and Plastic Packages."

George E. Dieter Chair Professor of Mechanical Engineering, for significant contributions to the reputation of the Department, College and University with the establishment of CALCE Electronic Products and Systems Center (2001).

Kan Tong Po Award from the United Kingdom Royal Society

3M Research Award for "research work in the electronics reliability area that has made significant contributions to the scientific understanding of material properties and their complex behavior."

ASME Electrical and Electronic Packaging Division (EPPD) Award "for outstanding contributions to the field of application of engineering mechanics to electronic packaging."

IEEE Undergraduate Teaching Award "for the development and realization of a cross disciplinary educational program in Computer Aided Life Cycle Engineering (CALCE)."

Outstanding paper of the year for the Microelectronics Int'l Journal, "Popcorning in PBGA Packages during IR Reflow Soldering," P. McCluskey, R. Munamarty, and M. Pecht, Vol. 42 No.1 (1997).

ISHM/IEPS William D. Ashman Memorial Achievement Award, "for his numerous contributions to academia and the electronics packaging industry."

IEEE Reliability Society's Annual Reliability Award "for his contributions to the IEEE Transactions on Reliability, his work with CALCE Electronic Packaging Research Center and his work on Reliability Standards."

American Society for Quality Control: Reliability Division Austin Bonis Award for the Advancement of Reliability Education for outstanding achievement in the advancement of reliability education.

Institute of Environmental Sciences Reliability Test and Evaluation Award (1996) "for vital contribution to the development and promotion of physics-of-failure modeling and analysis as a valuable reliability design and test process in the government, commercial and academic communities."

IEEE Standards Award for Chairing and developing IEEE Standards Methodology for Reliability Prediction and Assessment for Electronic Systems and Equipment #1413 and IEEE Reliability Program Standard #1332.

NASA certificate of "recognition of your significant contributions in the preparation and execution of the successful Second US Microgravity Payload (USMP-2) Mission, launched on March 4, 1994."

International Electronic Packaging Society (IEPS) Educational Award "for excellence in research and education at the University of Maryland CALCE Electronics Packaging Research Center." (1990)

Best paper of the year (Maurice Simpson Technical Editors Award) for the Journal of the Institute of Environmental Sciences, "Reliability Prediction of Electronic Packages," May/June 1990.

Professional Memberships and Service

Fellowships

Fellow, Society of Automotive Engineering (SAE) (2010) "for his research and promotion of the reliability of the electronic parts and systems used in automotive and aerospace applications."

Fellow, International Microelectronics and Packaging Society (IMAPS)

Fellow, American Society of Mechanical Engineers (ASME) (1995), "for promoting the art, science, and practice of mechanical engineering."

Fellow, Institute of Electrical and Electronics Engineers (IEEE) (1992), "for effectiveness in leadership in the development and realization of an exemplary program and successful efforts to raise the level of engineering excellence and practice within and without the organization."

Selected Publications

Books Authored/Edited

- Anand, D., D. Hazelwood, M. Pecht, and M. Kapilashrami, *Engineering For Social Change: Engineering Is Not Just Engineering*, CALCE EPSC Press, University of Maryland, College Park, MD, 2016.
- Chung, H. S., H. Wang, F. Blaabjerg, and M. Pecht, *Reliability of Power Electronic Converter Systems*, The Institution of Engineering and Technology, London, United Kingdom, 2015.
- Fries, A., W. P. Cherry, R. G. Easterling, E. A. Elsayed, A. V. Huzurbazar, P. A. Jacobs, W. Q. Meeker JR, G. Nagappan, M. Pecht, A. Sen, and S. V. Wiel, *Reliability Growth: Enhancing Defense System Reliability*, The National Academies Press, Washington, DC, 2015.
- Kapur, K., and M. Pecht, *Reliability Engineering*, John Wiley, Hoboken, NJ, 2014.
- Dai, J., M. Ohadi, D. Das, and M. Pecht, *Optimum Cooling of Data Centers: Application of Risk Assessment & Mitigation Techniques*, Springer Science, 2013.
- Chauhan, P., A. Choubey, Z. Zhong, and M. Pecht, *Copper Wire Bonding*, Springer-Verlag, New York, NY, 2013.
- Pecht, M., R. Kaczmarek, X. Song, D. Hazelwood, R. Kavetsky, and D. Anand, *Rare Earth Materials: Insights and Concerns*, CALCE EPSC Press, University of Maryland, College Park, MD, 2012.
- Bartels, B., U. Ermel, P. Sandborn, and M. Pecht, *Strategies to the Prediction, Mitigation, and Management of Product Obsolescence*, John Wiley, Hoboken, NJ, 2012.
- Pecht, M., K. C. Kapur, R. Kang, and S. Zhang, *Foundations of Reliability Engineering (in Chinese)*, Publishing House of Electronics Industry, China, 2011.
- Short, J. M., R. A. Kavetsky, M. Pecht, and D. K. Anand, *Energetics Science & Technology in China*, CALCE EPSC Press, University of Maryland, College Park, MD, 2010.
- Pecht, M. and R. Kang, *Diagnostics, Prognostics and System's Health Management (in Chinese)*, City Univ. of Hong Kong, 2010.
- Pecht, M., *China's Electronics Industry – The Definitive Guide for Companies and Policy Makers with Interests in China*, William Andrew Publishing, Norwich, NY, 2006; updated in 2010 with Len Zuga as co-author.
- Ardebili, H. and M. Pecht, *Encapsulation Technologies for Electronic Applications, Materials and Processes for Electronic Applications Series*, Elsevier Press, New York, NY, 2009.
- Pecht, M., *Product Reliability, Maintainability, and Supportability Handbook*, 2nd ed., CRC Press, Boca Raton, FL, 2009; 1st ed., 1995.
- Pecht, M., *Prognostics and Health Management of Electronics*, John Wiley, New York, NY, 2008.
- Ganesan S. and M. Pecht, *Lead-Free Electronics*, John Wiley, New York, NY, 2006.
- Das, D., M. Pecht, and N. Pendse, *Rating and Uprating of Electronic Products*, CALCE EPSC Press, University of Maryland, College Park, MD, 2004.
- Pecht, M., *Parts Selection and Management*, John Wiley, New York, NY, 2004.
- Liu, W. and M. Pecht, *IC Component Sockets*, John Wiley, Hoboken, NJ, 2004.
- Lee, S. B., M. Lee, and M. Pecht, *Korean Electronics Industry*, CALCE EPSC Press, University of Maryland, College Park, MD, 2004; update of Pecht M., J. Bernstein, M. Peckerar, and D. Searls, *The Korean Electronics Industry*, CRC Press, Boca Raton, FL, 1997.
- Castelli, C., C. Nash, C. Ditlow, and M. Pecht, *Sudden Acceleration – The Myth of Driver Error*, CALCE Press, University of Maryland, College Park, MD, 2003.
- Pecht, M., E. Bumiller, J. Pecht, and D. Douthit, *Contamination of Electronic Assemblies*, CRC Press, Boca Raton, FL, 2002.
- Pecht, M., R. Solomon, P. Sandborn, C. Wilkinson, and D. Das, *Life Cycle Forecasting, Mitigation Assessment and Obsolescence Strategies*, CALCE EPSC Press, University of Maryland, College Park, MD, 2002.
- Sharma, R., S. Parthasarathy, D. Bansal, and M. Pecht, *Indian Electronics Industry*, CALCE EPSC Press, University of Maryland, College Park, MD, 2002.
- Nakayama, W., W. Boulton, and M. Pecht, *The Japanese Electronics Industry*, CRC Press, Boca Raton, FL, 1999.
- Pecht, M., R. Radojcic, and G. Rao, *Guidebook for Managing Silicon Chip Reliability*, CRC Press, Boca Raton, FL, 1999.
- Pecht, M., R. Agarwal, P. McCluskey, T. Dishongh, S. Javadpour, and R. Mahajan, *Electronic Packaging Materials and their Properties*, CRC Press, Boca Raton, FL, 1999.
- Lall, P., Pecht, M., and E. Hakim, *The Influence of Temperature on Microelectronic Device Reliability*, CRC Press, Boca Raton, FL, 1997.
- Lee, C. and M. Pecht, *The Taiwan Electronics Industry*, CRC Press, Boca Raton, FL, 1997.
- Pecht, M., Beane, D., and A. Shukla, *The Singapore and Malaysia's Electronics Industries*, CRC Press, Boca Raton, FL, 1997.

- Hannemann, R., Kraus, A., and M. Pecht, *Semiconductor Packaging – A Multidisciplinary Approach*, John Wiley, New York, NY, 1997.
- Wong, Y. and M. Pecht, *Advanced Routing of Electronic Modules*, CRC Press, Boca Raton, FL, 1995.
- Pecht, J. and M. Pecht, *Long-term Non-operating Reliability of Electronic Products*, CRC Press, Boca Raton, FL, 1995.
- Pecht, M., Nguyen, L., and E. Hakim, *Plastic Encapsulated Microelectronics: Materials, Processes, Quality, Reliability, and Applications*, John Wiley, New York, NY, 1995.
- Pecht M., *Integrated Circuit, Hybrid and Multichip Module Package Design Guidelines*, John Wiley, New York, NY, 1994.
- Pecht, M., Dasgupta, A., Evans, J., and J. Evans, *Quality Conformance and Qualification of Electronic Packages*, John Wiley, New York, NY, 1994.
- Pecht, M., *Placement and Routing of Electronic Modules*, Marcel Dekker, New York, NY, 1993.
- Pecht, M., *Soldering Processes and Equipment*, John Wiley, New York, NY, 1993.
- Pecht, M., *Handbook of Electronic Package Design*, Marcel Dekker, New York, NY, 1991.

Articles

2017

- Q. Yang, R. Bi, K. Yung and M. Pecht, "Electrochemically Reduced Graphene Oxides/Nanostructured Iron Oxides as Binder-free Electrodes for Supercapacitors", *Electrochimica Acta*, vol. 231, pp. 125–134, 2017.
- Z. Liu, T. Liu, J. Han, S. Bu, X. Tang and M. Pecht, "Signal Model-Based Fault Coding for Diagnostics and Prognostics of Analog Electronic Circuits", *IEEE Transactions on Industrial Electronics*, vol. 64, no. 1, pp. 605–614, 2017.
- E. Cripps and M. Pecht, "A Bayesian Nonlinear Random Effects Model For Identification Of Defective Batteries From Lot Samples", *Journal of Power Sources*, vol. 342, pp. 342–350, 2017.
- N. Jameson, M. Azarian and M. Pecht, "Impedance-Based Condition Monitoring For Insulation Systems Used In Low-Voltage Electromagnetic Coils", *IEEE Transactions on Industrial Electronics*, pp. 1–1, 2017.
- Z. Liu, G. Sun, S. Bu, J. Han, X. Tang and M. Pecht, "Particle Learning Framework for Estimating the Remaining Useful Life of Lithium-Ion Batteries", *IEEE Transactions on Instrumentation and Measurement*, vol. 66, no. 2, pp. 280–293, 2017.
- M. Chang, M. Kang and M. Pecht, "Prognostics-Based LED Qualification Using Similarity-Based Statistical Measure with RVM Regression Model", *IEEE Transactions on Industrial Electronics*, pp. 1–1, 2017.
- A. Shrivastava, M. Azarian and M. Pecht, "Failure of Polymer Aluminum Electrolytic Capacitors Under Elevated Temperature Humidity Environments", *IEEE Transactions on Components, Packaging and Manufacturing Technology*, no. 99, pp. 1–6, 2017.
- P.Sanjeevikumar, S.B.Mahajan, F. Blaabjerg, M. Pecht, L. Martirano, M. Manganelli, "Dual Six-Phase Multilevel AC Drive with Single Carrier Optimized Five-Level PWM for Star-Winding Configuration", *Lecture Notes in Electrical Engineering*, Springer Journal Publications, Dec. 2016. (Invited Article and In Press appear in March 2017).
- P.Sanjeevikumar, S.B.Mahajan, P.Dhond, F. Blaabjerg, M. Pecht, "Non-Isolated Sextuple Output Hybrid Triad Converter Configurations for High Step-Up Renewable Energy Applications", *Lecture Notes in Electrical Engineering*, Springer Journal Publications, Dec. 2016. (Invited Article and In Press appear in March 2017).
- T. Formica and M. Pecht, "Return on Investment Analysis and Simulation of a 9.12kW (kW) Solar Photovoltaic System", *Solar Energy*, vol. 144, pp. 629–634, 2017.
- A. Fortier and M. Pecht, "A Perspective of the IPC Report on Lead-free Electronics in Military/aerospace Applications", *Microelectronics Reliability*, vol. 69, pp. 66–70, 2017.
- K. Venkitesamy, S. Padmanaban, M. Pecht, A. Awasthi and R. Selvamuthukumar, "A Modified Boost Rectifier For Elimination Of Circulating Current In Power Factor Correction Applications", *Microelectronics Reliability*, vol. 69, pp. 29–35, 2017.

2016

- S. Padmanaban and M. Pecht, "An Isolated/Non-Isolated Novel Multilevel Inverter Configuration For A Dual Three-Phase Symmetrical/Asymmetrical Star-Winding Converter", *Engineering Science and Technology, an International Journal*, vol. 19, no. 4, pp. 1763–1770, 2016.
- X. Cheng, L. Yao, Y. Xing and M. Pecht, "Novel Parametric Circuit Modeling for Li-Ion Batteries", *Energies*, vol. 9, no. 7, p. 539, 2016.
- B. Sun, X. Jiang, K. Yung, J. Fan and M. Pecht, "A Review of Prognostic Techniques for High-Power White LEDs", *IEEE Transactions on Power Electronics*, pp. 1–1, 2016.
- M. Pecht, T. Shibutani and L. Wu, "A Reliability Assessment Guide For The Transition Planning To Lead-Free Electronics For Companies Whose Products Are Rohs Exempted Or Excluded", *Microelectronics Reliability*, vol. 62, pp. 113–123, 2016.

- S. Mukherjee, P. Chauhan, M. Osterman, A. Dasgupta and M. Pecht, "Mechanistic Prediction of the Effect of Microstructural Coarsening on Creep Response of SnAgCu Solder Joints", *Journal of Electronic Materials*, vol. 45, no. 7, pp. 3712–3725, 2016.
- F. Zheng, Y. Xing, J. Jiang, B. Sun, J. Kim and M. Pecht, "Influence Of Different Open Circuit Voltage Tests On State Of Charge Online Estimation For Lithium-Ion Batteries", *Applied Energy*, vol. 183, pp. 513–525, 2016.
- A. Pearl, M. Osterman, and M. Pecht, "Evaluation of ENEPIG and Immersion Silver Surface Finishes Under Drop Loading", *Journal of Electronic Materials*, Vol. 45, No. 1, 2016. DOI:10.1007/s11664-015-4104-y
- George, E. and M. Pecht, "RoHS Compliance in Safety and Reliability Critical Electronics," *Microelectronics Reliability*, Vol. 65, pp. 1–7, October 2016.
- S. Kirillov, A. Kirillov, V. Iakimkin, A. Khodos, and M. Pecht, "PHM Applications in Medicine and Medical Implantable Devices", 2016 IEEE PHM Conference, Chengdu, China, October 19–21, 2016.
- A. Mohammed and M. Pecht, "A Stretchable And Screen-Printable Conductive Ink For Stretchable Electronics." *Applied Physics Letters*, Volume 109, Issue 18, 2016.
- Zheng, F., J. Jiang, B. Sun, W. Zhang, and M. Pecht, 2016, "Temperature Dependent Power Capability Estimation of Lithium-ion Batteries for Hybrid Electric Vehicles", *Energy*, 113, pp.64–75, 2016
- M. Pecht, Tadahiro Shibutani, Myeongsu Kang, Melinda Hodkiewicz, and Edward Cripps, "**A Fusion Prognostics-based Qualification Test Methodology for Microelectronic Products**", *Microelectronics Reliability*, Vol 63, pp 320–324, August 2016, DOI:10.1016/j.microrel.2016.04.002
- Woo, S. and Pecht, M., "Reliability Design of Residential-Sized Refrigerators Subjected to Repetitive Random Vibration Loads during Transportation", Athens: ATINER'S Conference Paper Series, No: TRA2016–1981. (2016).
- M. Kang, J. Kim, I. K. Jeong, J. M. Kim and M. Pecht, "A Massively Parallel Approach to Real-Time Bearing Fault Detection Using Sub-Band Analysis on an FPGA-Based Multicore System," in *IEEE Transactions on Industrial Electronics*, vol. 63, no. 10, pp. 6325–6335, Oct. 2016. doi: 10.1109/TIE.2016.2574986
- S. Saxena, C. Hendricks, M. Pecht, "Cycle Life Testing and Modeling of Graphite/LiCoO₂ Cells under Different State of Charge Ranges", *Journal of Power Sources*, Elsevier, pp 394–400, Vol 327, Sept. 2016.
- M. Kang, Ramaswami G. R., Hodkiewicz M., Cripps E., Kim J., Pecht M., "A Sequential k-Nearest Neighbor Classification Approach for Data-Driven Fault Diagnosis Using Distance- and Density-Based Affinity Measures", Springer International Publishing Switzerland 2016, pp. 253–261, 2016.
- G.P. Pandian, Ramaswami, G. K., Hodkiewicz, M., Cripps, E., and M. Pecht, "Long-term Reliability of Lead-free Electronic Systems," 23rd International Symposium on The Physical and Failure Analysis of Integrated Circuits, Singapore, July 20, 2016.
- S. Monoharan, Ramaswami, G. K., McCluskey, F. P., and M. Pecht, "Failure Mechanism in Encapsulated Copper Wire-Bonded Devices," 23rd International Symposium on The Physical And Failure Analysis of Integrated Circuits, Singapore, July 20, 2016.
- N. Li, Yu X, Pecht M, "Position and Enforcement Practice of the People's Republic of China's Pharmaceutical Data Exclusivity Protection", *Drug Design, Development and Therapy*, Dovepress, Vol 2016:10, pp. 2015–2020, June 2016.
- N. Jordan Jameson, Kai Wang, Carlos Morillo, Michael H. Azarian, and Michael Pecht, "Health Monitoring of Solenoid Valve Electromagnetic Coil Insulation under Thermal Deterioration," *Proceedings of MFPT 2016/ISA's 62nd IIS*, Dayton, OH, May 24–26, 2016. Won Best Student Paper Award of Conference (2016).
- Williard, N., C. Hendricks, B. Sood, J. S. Chung, and M. Pecht, "Evaluation of Batteries for Safe Air Transport," *Energies*, Vol. 9, No. 5, pp. 340, May. 2016.
- Wong, E.H., W.D. van Driel, A. Dasgupta, M. Pecht, "Creep Fatigue Models of Solder Joints: A Critical Review," *Microelectronics Reliability*, Vol. 59, pp. 1–12, Apr. 2016.
- Kang, Myeongsu, Jong-Myon Kim, Rui Peng, Xiaoyang Ma, Michael Pecht, "DWPT-Based Sub-Band Analysis for Fault Detection of Rolling Element Bearings", *Scientific Journal of Information Engineering*, Volume 6, Issue 2, pp.1–7, April 2016.
- Yoon, J. R., E. Baek, H.-K. Kim, M. Pecht, and S. H. Lee, "Critical Dual Roles of Carbon Coating in H₂Ti₁2O₂₅ for Cylindrical Hybrid Supercapacitors," in *Carbon*, Elsevier Press, Vol. 101, pp. 9–15, May 2016.
- Kang, Myeongsu, R. Islam, J. Kim, J. Kim, and M. Pecht, "A Hybrid Feature Selection Scheme for Reducing Diagnostic Performance Deterioration Caused by Outliers in Data-Driven Diagnostics," *IEEE Transactions on Industrial Electronics*, vol. 63, no. 5, pp. 3299 – 3310, 2016.
- Tian, J., C. Morillo, M. H. Azarian, and M. Pecht, "Motor Bearing Fault Detection Using Spectral Kurtosis-based Feature Extraction Coupled with k-Nearest Neighbor Distance Analysis," *IEEE Trans. Ind. Electron.*, Vol. 63, pp. 1793–1803, March 2016.
- Lee, J.-H., H.-K. Kim, E. Baek, M. Pecht, S.-H. Lee, and Y.-H. Lee, "Improved Performance of Cylindrical Hybrid Supercapacitor using Activated Carbon/ Niobium Doped Hydrogen Titanate," *Journal of Power Sources*, Vol. 301, pp. 348–354, Jan. 2016.

Wan, Y., H. Huang, D. Das, and M. Pecht, "Thermal Reliability Prediction and Analysis for High-density Electronic Systems Based on the Markov Process," *Microelectronics Reliability*, Vol. 56, pp. 182–188, Jan. 2016.

Pearl, A., M. Osterman, and M. Pecht, "Evaluation of ENEPIG and Immersion Silver Surface Finishes Under Drop Loading," *Journal of Electronic Materials*, Vol. 45, pp. 391–402, Jan. 2016.

2015

Charbaji, A., M. Osterman, and M. Pecht, "Influence of Varying H₂S Concentrations and Humidity Levels on ImAg and OSP Surface Finishes," *International Journal of Mechanical Engineering and Technology*, Vol. 6, no. 12, pp. 18–29, Dec. 2015.

Ning, Y., M. Azarian, and M. Pecht, "Effects of Voiding on Thermo-mechanical Reliability of Copper-filled Microvias: Modeling and Simulation," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, pp. 500–510, Dec. 2015.

Williard, N., D. Baek, J. Park, B. Choi, M. Osterman, and M. Pecht, "A Life Model for Supercapacitors," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, pp. 519–528, Dec. 2015.

Tessa, L.L., B. P. Sood and M. G. Pecht, "Field Reliability Estimation for Cochlear Implants," in *IEEE Transactions on Biomedical Engineering*, vol. 62, no. 8, pp. 2062–2069, Aug. 2015.
doi: 10.1109/TBME.2015.2412127

Fan, J., C. Qian, K.-C. Yung; X. Fan, G. Zhang, and M. Pecht, "Optimal Design of Life Testing for High Brightness White LEDs Using the Six Sigma DMAIC Approach," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, no. 99, pp. 576–587, Dec. 2015.

Fan, J., C. Qian, X. Fan, G. Zhang, and M. Pecht, "In-situ Monitoring and Anomaly Detection for LED Packages Using a Mahalanobis Distance Approach," *First International Conference on Reliability System Engineering & Prognostics and System Health Management Conference-Beijing (2015 ICRSE & PHM-Beijing)*, Beijing, China, Oct. 23, 2015. (won best paper award)

Hendricks, Chris, N. Williard, S. Mathew, M. Pecht, A Failure Modes, Mechanisms, and Effects Analysis (FMMEA) of Lithium-ion Batteries, *Journal of Power Sources*, Vol. 297, pp. 113–120, 2015.

Jameson, N., X. Song, and M. Pecht, N, "Conflict Minerals in Electronic Systems: An Overview and Critique of Legal Initiatives," *Sci Eng Ethics*, vol. 22, no. 5, pp. 1375–1389, Sep. 2015.
DOI: 10.1007/s11948-015-9704-7.

Oh, H., S. Choi, K. Kim, B. D. Youn, and M. Pecht, "An Empirical Model to Describe Performance Degradation for Warranty Abuse Detection in Portable Electronics," *Reliability Engineering & System Safety*, Vol. 142, pp. 92–99, Oct. 2015.

Wang, K., J. Tian, M. Pecht, and A. Xu, "A Prognostics and Health Management Method for Instrumentation System Remanufacturing," *2015 IEEE Conference on Technologies for Sustainability*, Ogden, UT, USA., June 30–August 1, 2015.

Leng, F., C. M. Tan, and M. Pecht, "Effect of Temperature on the Aging Rate of Li Ion Battery Operating Above Room Temperature," *Scientific Reports, Nature*, Aug. 6, 2015.

Wan, Y., H. Huang, and M. Pecht, "Thermal Fatigue Reliability Analysis and Structural Optimization Based on a Robust Method for Microelectronics FBGA Packages," *IEEE Transactions on Device and Materials Reliability*, Vol. 15, No. 2, pp. 206–213, June 2015.

Menon, S., X. Jin, T. W. S. Chow, and M. Pecht, "Evaluating Covariance in Prognostic and System Health Management Applications," *Mechanical Systems and Signal Processing*, Vols. 58–59, pp. 206–217, June 2015.

Menon, S., E. George, M. Osterman, and M. Pecht, "High Lead (Over 85 %) Solder in the Electronics Industry: RoHS Exemptions and Alternatives," *Journal of Materials Science: Materials in Electronics*, Vol. 26, No. 6, pp. 4021–4030, June 2015.

Patil, N., D. Das, and M. Pecht, "Anomaly Detection for IGBTs Using Mahalanobis Distance," *Microelectronics Reliability*, Vol. 55, No. 7, pp. 1054–1059, June 2015.

Ma, P., S. Wang, L. Zhao, M. Pecht, X. Su, and Z. Ye, "An Improved Exponential Model for Predicting the Remaining Useful Life of Lithium-ion Batteries," *IEEE Conference on Prognostics and Health Management (PHM)*, 2015, pp. 1–6, 22–25 June 2015.

Guo, J., Z. Li, and M. Pecht, "A Bayesian Approach for Li-ion Battery Capacity Fade Modeling and Cycles to Failure Prognostics," *Journal of Power Sources*, Vol. 281, pp. 173–184, May 2015.

Wang, K., J. Tian, M. Pecht, and A. Xu, "A Prognostics and Health Management Based Method for Refurbishment Decision Making for Electromechanical Systems," *Proceedings of the 15th IFAC Symposium on Information Control Problems in Manufacturing*, Ottawa, Canada, pp. 481–486, May 11–13, 2015.

Hendricks, C., W. He, M. Osterman, M. Hurley, S. Fagan, S. Field, W. Hardman, V. Manivannan, and M. Pecht, "An Approach for Assessing Battery State of Health with Limited Data," *The Aircraft Airworthiness and Sustainment Conference*, Baltimore, MD, April 2, 2015.

Fan, J., K.-C. Yung, and M. Pecht, "Predicting Long-term Lumen Maintenance Life of LED Light Sources Using a Particle Filter-based Prognostic Approach," *Expert Systems with Applications*, Vol. 42, No. 5, pp. 2411–2420, April 2015.

Chang, M.-H., P. Sandborn, M. Pecht, W. K. C. Yung, W. Wang, "A Return on Investment Analysis of Applying Health Monitoring to LED Lighting Systems," *Microelectronics Reliability*, Vol. 55, Nos. 3–

4, pp. 527–537, Feb. 2015.

George, E., M. Osterman, and M. Pecht, "An Evaluation of Dwell Time and Mean Cyclic Temperature Parameters in the Engelmaier Model," *Microelectronics Reliability*, Vol. 55, Nos. 3–4, pp. 582–587, Feb. 2015.

Jameson, N. J., M. H. Azarian, and M. Pecht, "Fault Diagnostic Opportunities for Solenoid Operated Valves Using Physics-of-Failure Analysis," *Reliability Digest*, Feb. 2015.

Oh, H., M. Azarian, C. Morillo, M. Pecht, and E. Rhem, "Failure Mechanisms of Ball Bearings Under Lightly Loaded, Non-accelerated Usage Conditions," *Tribology International*, Vol. 81, pp. 291–299, Jan. 2015.

Niu, G., Y. Zhao, M. Defoort, and M. Pecht, "Fault Diagnosis of Locomotive Electro-pneumatic Brake Through Uncertain Bond Graph Modeling and Robust Online Monitoring," *Mechanical Systems and Signal Processing*, Vols. 50–51, pp. 676–692, Jan. 2015.

Kwon, D., Azarian, M. H., and Pecht, M., "Remaining Life Prediction of Solder Joints Using RF Impedance Analysis and Gaussian Process Regression," *IEEE Transactions on Components, Packaging and Manufacturing Technology*, vol. 5(11), pp. 1602–1609, 2015.

2014

Vasan, A., B. Sood, and M. Pecht, "Carbon Footprinting of Electronic Products," *Applied Energy*, Vol. 136, pp. 636–648, Dec. 2014.

Bai, G., P. Wang, C. Hu, and M. Pecht, "A Generic Model-free Approach for Lithium-ion Battery Health Management," *Applied Energy*, Vol. 135, pp. 247–260, Dec. 2014.

Zhang, W., S. Liu, B. Sun, Y. Liu, and M. Pecht, "A Cloud Model-based Method for the Analysis of Accelerated Life Test Data," *Microelectronics Reliability*, Vol. 55, No. 1, pp. 123–128, Nov. 2014.

He, W., N. Williard, C. Chen, and M. Pecht, "State of Charge Estimation for Li-ion Batteries Using Neural Network Modeling and Unscented Kalman Filter-based Error Cancellation," *International Journal of Electrical Power and Energy Systems*, Vol. 62, pp. 783–791, Nov. 2014.

Ratzker, M., A. Pearl, M. Osterman, M. Pecht, and G. Milad, "Review of Capabilities of the ENEPIG Surface Finish," *Electronic Materials*, Vol. 43, No. 11, pp. 3885–3897, Nov. 2014.

He, Xiaofei., M. H. Azarian and M. Pecht, "Analysis of the Kinetics of Electrochemical Migration on Printed Circuit Boards Using Nernst-Planck Transport Equation," *Electrochimica Acta*, Vol. 142, pp. 1–10, Oct. 2014.

Chauhan, P., S. Mathew, M. Osterman, and M. Pecht, "In-situ Interconnect Failure Prediction Using Canaries," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 3, pp. 826–832, Sept. 2014.

Chang, M.-H., C. Chen, D. Das, and M. Pecht, "Anomaly Detection of Light-Emitting Diodes Using the Similarity-based Metric Test," *IEEE Transactions on Industrial Informatics*, Vol. 10, No. 3, pp. 1852–1863, Aug. 2014.

R. Bakhshi, M. Azarian, and M. Pecht, "Effects of Voiding on the Degradation of Microvias in High Density Interconnect Printed Circuit Boards Under Thermomechanical Stresses" *IEEE Transactions On Components, Packaging And Manufacturing Technology*, Vol. 4, No. 8, Aug. 2014

George, E., and M. Pecht, "A Lead-free Transition Plan for Safety and Reliability Critical Products," *International Conference on Challenges in IT, Engineering and Technology (ICCIET) Phuket, Thailand*, July 17–18, 2014.

Varde, P.V., J. Tian, M. Pecht, "Prognostics and Health Management based Refurbishment for Life Extension of Electronic Systems," *IEEE ICIA & ICAL 2014*, Hailar, China, July 26–28, 2014

Tian, J., M. H. Azarian, and M. Pecht, "Rolling Element Bearing Fault Detection Using Density-based Clustering," *IEEE Conference on Prognostics and Health Management (PHM)*, Spokane, WA, June 22–25, 2014.

Shrivastava, A., M. H. Azarian, C. Morillo, B. Sood, and M. Pecht, "Detection and Reliability Risks of Counterfeit Electrolytic Capacitors," *IEEE Transactions on Reliability*, Vol. 63, No. 2, pp. 468–479, June 2014.

Fritzler, T., M. Azarian, and M. Pecht, "Scintillation Conditioning of Tantalum Capacitors with Manganese Dioxide Cathodes," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 2, pp. 630–638, June 2014.

Pecht, M., and Anwar Mohammed, "Intermittent Failures in Hardware and Software," *International Journal of Electrical Engineering and Technology (IJEET)*, Vol. 5, No. 5, pp. 57–73, May 2014.

Haddad, G., P. A. Sandborn, and M. G. Pecht, "Using Maintenance Options to Maximize the Benefits of Prognostics for Wind Farms," *Wind Energy*, Vol. 17, pp. 775–791, May 2014.

Leng, F., C. M. Tan, M. Pecht, and J. Y. Zhang, "The Effect of Temperature on the Electrochemistry in Lithium-ion Batteries," *3rd International Symposium on Next-Generation Electronics*, Taoyuan, Taiwan, May 7–10, 2014.

Jin, X., M. Zhao, T. Chao, and M. Pecht, "Motor Bearing Fault Diagnosis Using Trace Ratio Linear Discriminant Analysis," *IEEE Transactions on Industrial Electronics*, Vol. 61, No. 5, pp. 2441–2451, May 2014.

Peter, A., M. H. Azarian, M. Pecht, "Step Stress Testing of Electric Double Layer Capacitors," *International Capacitor and Resistor Technology Symposium*, Santa Clara, CA, April 2014.

- Sun, J., H. Zuo, W. Wang, and M. Pecht, "Prognostics Uncertainty Reduction by Fusing On-line Monitoring Data Based on a State-space-based Degradation model," *Mechanical Systems and Signal Processing*, Vol. 45, No. 2, pp. 396-407, April 2014.
- Ning, Y., M. Azarian, and M. Pecht, "Simulation of the Influence of Manufacturing Quality on Thermomechanical Stresses of Microvias," *IPC EXPO 2014*, Mar. 23-27, 2014.
- Chai, F., M. Osterman, and M. Pecht, "Strain-range-based Solder Life Predictions Under Temperature Cycling with Varying Amplitude and Mean," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 1, pp. 351-57, Mar. 2014.
- Fan, J., K.-C. Yung, and M. Pecht, "Prognostics of Chromaticity State for Phosphor-converted White Light Emitting Diodes Using an Unscented Kalman Filter Approach," *IEEE Transactions on Device and Materials Reliability*, Vol. 14, No. 1, pp. 564-573, Mar. 2014.
- Bakhshi, R., S. Kunche, and M. Pecht, "Intermittent Failures in Hardware and Software," *Journal of Electronic Packaging*, Vol. 136, No. 1, pp. 1-5, Mar. 2014.
- Shrivastava, A., S. Bangerth, M. Azarian, C. Morillo, M. Pecht, M. Levin, L. Steinhardt, and A. Callini, "Detection of Capacitor Electrolyte Residues with FTIR in Failure Analysis," *Journal of Materials Science: Materials in Electronics*, Vol. 25, No. 2, pp. 635-644, Feb. 2014.
- Shrivastava, A., and M. Pecht, "Counterfeit Capacitors in the Supply Chain," *Journal of Materials Science: Materials in Electronics*, Vol. 25, No. 2, pp. 645-652, Feb. 2014.
- Xing, Y., W. He, and M. Pecht, "State of Charge Estimation of Lithium-ion Batteries Using the Open-circuit Voltage at Various Ambient Temperatures," *Applied Energy*, Vol. 113, pp. 106-115, Jan. 2014. Won The 2015 Applied Energy Award – highly cited research papers.
- George, E., and M. Pecht, "Tin Whisker Analysis of an Automotive Engine Control Unit," *Microelectronics Reliability*, Vol. 54, No. 1, pp. 214-219, Jan. 2014.

2013

- Pecht, M. "The Counterfeit Electronics Problem," *Open Journal of Social Sciences*, Vol. 1, No. 7, pp. 12-16, Dec. 2013.
- He, W., N. Williard, C. Chen, and M. Pecht, "Health Management of Batteries Based on Differential Evolution," *7th International Conference on Software, Knowledge, Information Management, and Applications (SKIMA 2013)*, Chiang Mai, Thailand, Dec. 18-20, 2013.
- Ye, Z. S., Y. Wang, K. L. Tsui, and M. Pecht, "Degradation Data Analysis Using Wiener Processes with Measurement Errors," *IEEE Transactions on Reliability*, Vol. 62, No. 4, pp. 772-780, Dec. 2013.
- Patil, N., D. Das, E. Scanff, and M. Pecht, "Long Term Storage Reliability of Antifuse Field Programmable Gate Arrays," *Microelectronics Reliability*, Vol. 53, No. 12, pp. 2052-2056, Dec. 2013.
- Datong, L., Y. Luo, Y. Peng, J. Liu, L. Guo, and M. Pecht, "Lithium-ion Battery Remaining Useful Life Estimation Based on Fusion Nonlinear Degradation AR Model and RPF Algorithm," *Neural Computing and Applications*, Vol. 25, Nos. 3-4, pp. 557-573, Nov. 2013.
- Dai, J., D. Das, M. Ohadi, and M. Pecht, "Reliability Risk Mitigation of Free Air Cooling Through Prognostics and Health Management," *Applied Energy*, Vol. 111, pp. 104-112, Nov. 2013.
- Vasan, A., B. Long, and M. Pecht, "Diagnostics and Prognostics Method for Analog Electronic Circuits," *IEEE Transactions on Industrial Electronics*, Vol. 60, No. 11, pp. 5277-5291, Nov. 2013.
- Wang, D., Q. Miao, and M. Pecht, "Prognostics of Lithium-ion Batteries Based on Relevance Vectors and a Conditional Three-Parameter Capacity Degradation Model," *Journal of Power Sources*, Vol. 239, pp. 253-264, Oct. 2013.
- Sood, B., M. Osterman, and M. Pecht, "Health Monitoring of Lithium-ion Batteries," *IEEE Symposium on Product Compliance Engineering (ISPCE)*, Austin, TX, pp. 1-6, Oct. 7-9 2013.
- George, E., M. Osterman, M. Pecht, R. Coyle, R. Parker, and E. Benedetto, "Thermal Cycling Reliability of Alternative Low-Silver Tin-based Solders," *46th International Symposium on Microelectronics*, Orlando, FL, Sept. 29-Oct. 3, 2013.
- Menon, S., A. Pearl, M. Osterman, and M. Pecht, "Effect of ENEPIG Surface Finish on the Vibration Reliability of Solder Interconnects," *46th International Symposium on Microelectronics*, Orlando, FL, Sept 30-Oct. 3, 2013
- Jin, X., T. W. S. Chow, and M. Pecht, "Online Anomaly Detection of Brushless DC Motor Using Current Monitoring Technique," *Prognostics and System Health Management Conference (PHM-2013)*, Milan, Italy, Sept. 8-11, 2013.
- Krillov, A., S. Krillov, and M. Pecht, "Remote Calculating PHM Cluster: The First Results," *Prognostics and System Health Management Conference (PHM-2013)*, Milan, Italy, Sept. 8-11, 2013.
- Raveendran, R. K. S., M. Azarian, N. H. Kim, and M. Pecht, "Effect of Multiple Faults and Fault Severity on Gearbox Fault Detection in a Wind Turbine Using Electrical Current Signals," *Prognostics and System Health Management Conference (PHM-2013)*, Milan, Italy, Sept. 8-11, 2013.
- Williard, N., W. He, C. Hendricks, and M. Pecht, "Lessons Learned from the 787 Dreamliner on Lithium-ion Battery Reliability," *Energies*, Vol. 6, No. 9, pp. 4682-4695, Sept. 2013.

- Song, X., M. H. Chang, and M. Pecht, "Rare-Earth Elements in Lighting and Optical Applications and Their Recycling," *Journal of the Minerals, Metals & Materials Society (JOM)*, Vol. 65, No. 10, pp. 1276–1282, Aug. 2013.
- Chauhan, P., Z. W. Zhong, and M. Pecht, "Copper Wire Bonding Concerns and Best Practices," *Journal of Electronic Materials*, Vol. 42, No. 8, pp. 2415–2434, Aug. 2013.
- Tamilselvan, P., P. Wang, and M. Pecht, "A Multi-attribute Classification Fusion System for Insulated Gate Bipolar Transistor Diagnostics," *Microelectronics Reliability*, Vol. 53, No. 8, pp. 1117–1129, Aug. 2013.
- Srivinas, V., S. Menon, M. Osterman, and M. Pecht, "Modeling the Rate Dependent Durability of Reduced-Ag SAC Interconnects for Area Array Packages Under Torsion Loads," *Journal of Electronic Materials*, Vol. 42, No. 8, pp. 2606–2614, July 2013.
- Chauhan, P., S. Mukherjee, M. Osterman, A. Dasgupta, and M. Pecht, "Effect of Isothermal Aging on Microstructure and Creep Properties of SAC305 Solder: A Micromechanics Approach," *International Technical Conference and Exhibition on Packaging and Integration of Electronic and Photonic Microsystems (InterPACK2013)*, Burlingame, CA, July 16–18, 2013.
- Tian, J., M. Pecht, L. Yang, and Q. Miao, "A K-Means Clustering Based Method in Rolling Element Bearing Fault Detection," *International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering (QR2MSE2013) & International Conference on Materials and Reliability (ICMR 2013)*, Sichuan, China, July 15–18, 2013.
- Vasan, A., M. Pecht, and B. Long, "Health Assessment of Electronic Systems," *International Conference on Quality, Reliability, Risk, Maintenance, and Safety Engineering (QR2MSE2013) & International Conference on Materials and Reliability (ICMR 2013)*, Sichuan, China, July 15–18, 2013.
- Pecht, M., "Battery Reliability of Electric Vehicles," *Mathematical Methods in Reliability Conference (MMR 2013)*, Stellenbosch, South Africa, July 1–4, 2013.
- Vasan, A., C. Chen, and M. Pecht, "Circuit-centric Approach for Electronic System-level Prognostics," *IEEE Conference on Prognostics and Health Management (PHM)*, Gaithersburg, MD, June 24–27, 2013.
- Sreenilayam-Raveendram, R.-K., M. Azarian, and M. Pecht, "Detection of Under-lubricated Ball Bearings Using Vibration Signals," *IEEE Conference on Prognostics and Health Management (PHM)*, Gaithersburg, MD, June 24–27, 2013.
- Tian, J., C. Morillo, and M. Pecht, "Rolling Element Bearing Fault Diagnosis Using Simulated Annealing Optimized Spectral Kurtosis," *IEEE Conference on Prognostics and Health Management (PHM)*, Gaithersburg, MD, pp. 1–5, June 24–27 2013.
- Kumar, R., M. Azarian, E. Rhem, and M. Pecht, "Classification of Lubricant Level in Ball Bearings Using Vibration Signals," *IEEE Conference on Prognostics and Health Management (PHM)*, Gaithersburg, MD, Jun. 24–27, 2013.
- Liu, D., P. J. Yue, Z. J. Bao, Y. Peng, and M. Pecht, "Prognostics for State-of-Health Lithium-ion Battery Based on Combination Gaussian Process Functional Regression," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 832–839, June 2013. {Top 5 most highly cited articles in *Microelectronics Reliability* for each year 2014, 2015, 2016}.
- He, W., N. Williard, C. Chen, and M. Pecht, "State of Charge Estimation for Electric Vehicle Batteries Using Unscented Kalman Filtering," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 840–847, June 2013.
- Chen, Y., Q. Miao, B. Zheng, S. Wu, and M. Pecht, "Quantitative Analysis of Lithium-ion Battery Capacity Prediction via Adaptive Bathtub-shaped Function," *Energies*, Vol. 6, No. 6, pp. 3082–3096, June 2013.
- Miao, Q., L. Xie, H. Cui, W. Liang, and M. Pecht, "Remaining Useful Life Prediction of Lithium-ion Battery with Unscented Particle Filter Technique," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 805–810, June 2013.
- Xing, Y., E. W. M. Ma, K.-L. Tsui, and M. Pecht, "An Ensemble Model for Predicting the Remaining Useful Performance of Lithium-ion Batteries," *Microelectronics Reliability*, Vol. 53, No. 6, pp. 811–820, June 2013.
- Alam, M., M. Azarian, and M. Pecht, "Modeling the Electrical Conduction in Epoxy-BaTiO₃ Nanocomposites," *Journal of Electronic Materials*, Vol. 42, No. 6, pp. 1101–1107, Jun. 2013.
- Raveendran, R. K. S., M. Azarian, N. H. Kim, and M. Pecht, "Effect of Multiple Faults and Fault Severity on Gearbox Fault Detection in a Wind Turbine Using Electrical Current Signals," *Chemical Engineering Transactions*, Vol. 33, pp. 79–84, 2013.
- Choi, S., B. D. Youn, and M. Pecht, "A Liquid Contact Indicator Model for Warranty Abuse Detection in Portable Electronics," *Proceedings of the 2013 IEEE International Conference on Prognostics and Health Management (PHM)*, Gaithersburg, MD, pp. 1–8, June 2013.
- Ye, H., S. Xue, and M. Pecht, "Effects of Thermal Cycling on Rare Earth (Pr)-induced Sn Whisker/Hillock Growth," *Materials Letters*, Vol. 98, No. 1, pp. 78–81, May 2013.
- Kumar, R., M. Azarian, C. Morillo, M. Pecht, K. Kida, E. Santos, T. Honda, and H. Koike, "Comparative Evaluation of Metal and Polymer Ball Bearings," *Wear*, Vol. 302, Nos. 1–2, pp. 1499–1505, Apr.–May 2013.

- Cong, F., J. Chen, G. Dong, and M. Pecht, "Vibration model of rolling element bearings in a rotor-bearing system for fault diagnosis," *Journal of Sound and Vibration*, Vol. 332, No. 8, pp. 2081–2097, Apr. 2013.
- Chauhan, P., M. L. Wu, M. Osterman, and M. Pecht, "Evolution of Bulk and Interfacial Microstructure of SAC305 and SN100C Solders on ENIG/Cu Pads Under Isothermal Aging," *International Conference on Electronics Packaging (ICEP)*, Osaka, Japan, Apr. 10–12, 2013.
- Moriyama, M., M. Azarian, and M. Pecht, "Failure Mode Analysis of Electrical Double Layer Capacitors," *International Conference on Electronics Packaging (ICEP)*, Osaka, Japan, Apr. 10–12, 2013.
- Roller, J., B. Sood, and M. Pecht, "Reliability of Electroless Nickel Immersion Gold Finishes," *International Conference on Electronics Packaging (ICEP)*, Osaka, Japan, Apr. 10–12, 2013.
- Yin, L., S. Wei, Z. Xu, Y. Geng, D. Das, and M. Pecht, "The Effect of Joint Size on the Creep Properties of Microscale Lead-free Solder Joints at Elevated Temperatures," *Journal of Materials Science: Materials in Electronics*, Vol. 24, No. 4, pp. 1369–1374, Apr. 2013. (see "Erratum," Vol. 24, No. 7, July 2013).
- Oh, Hyunseok, M. H. Azarian, and D. Das, "A Critique of the IPC-9591 Standard: Performance Parameters for Air Moving Devices," *IEEE Transactions on Device and Materials Reliability*, Vol. 13, No. 1, pp. 146–155, Mar. 2013.
- Wang, Y., Q. Miao, E. W. M. Ma, K.-L. Tsui, and M. Pecht, "Online Anomaly Detection for Hard Disk Drives Based on Mahalanobis Distance," *IEEE Transactions on Reliability*, Vol. 62, No. 1, pp. 136–145, Mar. 2013.
- Williard, N., W. He, M. Osterman, and M. Pecht, "Comparative Analysis of Features for Determining State of Health in Lithium-ion Batteries," *International Journal of the PHM Society, Special Issue: Battery Management*, Vol. 4, No. 1, pp. 1–7, Mar. 2013.
- Challa, V., P. Rundle, and M. Pecht, "Challenges in the Qualification of Electronic Components and Systems," *IEEE Transactions on Device and Materials Reliability*, Vol. 13, No. 1, pp. 26–35, Mar. 2013.
- Kunche, S., C. Chen, and M. Pecht, "Optimized Diagnostic Model Combination for Improving Diagnostic Accuracy," *IEEE Aerospace Conference, Big Sky, MT*, Mar. 2–9, 2013.
- Dorj, E., C. Chen, and M. Pecht, "A Bayesian Hidden Markov Model-based Approach for Anomaly Detection in Electronic Systems," *IEEE Aerospace Conference, Big Sky, MT*, Mar. 2–9, 2013.
- Song, B., M. Azarian, and M. Pecht, "Effect of Temperature and Relative Humidity on the Impedance Degradation of Dust-contaminated Electronics," *Journal of the Electrochemical Society*, Vol. 160, pp. C97–C105, 2013.
- Miao, Q., C. Tang, W. Liang, and M. Pecht, "Health Assessment of Cooling Fan Bearing Using Wavelet-based Filtering," *Sensors*, Vol. 13, pp. 274–291, 2013.
- Vasan, A., D. Mahadeo, R. Doraiswami, Y. Huang, and M. Pecht, "Point-of-Care Biosensor System," *Frontiers in Bioscience, Scholar*, Vol. 5S, pp. 39–71, Jan. 2013.
- Li, B., X. P. Zhang, Y. Yang, L. M. Yin, and M. Pecht, "Size and Constraint Effects on Interfacial Fracture Behavior of Microscale Solder Interconnects," *Microelectronics Reliability*, Vol. 53, No. 1, pp. 154–163, Jan. 2013.