



The Department of MECHANICAL ENGINEERING



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McCluskey, F. Patrick



Professor

Leader, Design and Systems Reliability Division

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Research Interests

High temperature and high power electronics packaging, materials, and reliability

Education

Ph.D., Lehigh University, 1991

M.S., Lehigh University, 1986

B.S., Lafayette College, 1984

Professional Memberships and Service

Associate Editor, *IEEE Components and Packaging Technologies*

Co-organizer of Symposium N: Microelectronics and Microsystem Packaging, Materials Research Society Spring Meeting (2001)

Organizing Committee and Short Course Director, Fifth International High Temperature Electronics Conference (June 2000)

Member, NSF Proposal Review Panel on Materials Processing and Manufacturing

Technical Program Chair, IMAPS International Conference on High Temperature Electronics, (2004, 2006, 2008)

Technical Program Committee for SIA Int'l Conference on Automotive Power Electronics (2009)

Organizing Committee for the CIPS Conference (2010, 2012)

Organizing Committee for IMAPS European High Temperature Electronics Conference (2009, 2011)

Selected Publications

2009

P. Quintero, F. P. McCluskey, "Silver-Indium Transient Liquid Phase Sintering for High Temperature Die Attachment," *J. Microelectronics and Electronic Packaging*, Vol. 6, pp. 66-74. (2009).

R. W. Chang and F. P. McCluskey, "Reliability Assessment of Indium Solder for Low Temperature Electronic Packaging," *Cryogenics*, 49 (11), pp. 630-634 (2009).

2006

F. P. McCluskey, M. Dash, Z. Wang, and D. Huff, "Reliability of High Temperature Solder Alternatives," *Microelectronics Reliability*, Vol. 46, No. 9-11, pp. 1910-1914 (2006).

2004

Chandrasekaran and F. P. McCluskey, "Effect of Green Molding Compounds on High Temperature Wirebond Reliability," *Micromaterials and Nanomaterials*, Issue 3. Vol. 2004. pp. 134–143, (2004).

2003

K. Meyyappan, P. McCluskey, and L. Chen, "Thermomechanical Analysis of Gold-Based SiC Die Attach Assembly," *IEEE Trans Device and Materials Reliability*, Vol. 3, No. 4. pp. 152–158, (2003).

2001

McCluskey, F.P., "Fatigue and Intermetallic Formation in Lead Free Solder Die Attach," Proceedings of IPACK'01, *The Pacific Rim/ASME International Electronic Packaging Technical Conference and Exhibition*, July 9–13, 2001, Kauai, HI.

McCluskey, F.P., "A Web-Based Graduate Course on the Mechanical Design of High Temperature and High Power Electronics," *Proceedings of the Electronic Component and Technology Conference*, Lake Buena Vista, FL, May 30, 2001, pp. 397–400.

2000

McCluskey, F.P., K. Mensah, C. O'Connor, and A. Gallo, "Reliable Use of Commercial Technology in High Temperature Environments," *Microelectronics Reliability*, Vol. 40, pp. 1671–1678 (2000).

McCluskey, F.P., Y.D. Kweon, H.J. Lee, J.W. Kim, and H.S. Jeon, "Method for Assessing Remaining Life in Electronics Assemblies," *Microelectronics Reliability*, Vol. 40, No. 2, pp. 293–306 (2000).

1998

Palli, N., S. Azarm, F.P. McCluskey, and R. Sundararajan, "An Interactive Multistage e-Inequality Constraint Method for Multiple Objectives Decision Making," *Journal of Mechanical Design*, Vol. 120, pp. 678–686 (December 1998).

R.R. Grzybowski and F.P. McCluskey, "High Temperature Performance of Polymer Film Capacitors," *Journal of Microelectronic Packaging*, Vol. 1, pp. 153–158 (1998).

McCluskey, P., F. Lilie, O. Beysser, A. Gallo, "Low Temperature Delamination of Plastic Encapsulated Microcircuits," *Microelectronics Reliability*, Vol. 38, No. 12, pp. 1829–1834 (December 1998).

McCluskey, F.P., E.B. Hakim, J. Fink, A. Fowler, and M. Pecht, "Reliability Assessment of Electronic Components Exposed to Long-Term Non-Operating Conditions," *IEEE Transactions on Components, Packaging and Manufacturing Technology, Part A*, Vol. 21, No. 2, pp. 352–360 (June 1998).

1997

McCluskey, F.P., M.B. Wright, and D. Humphrey, "Uprating Electronic for Use Outside their Temperature Specifications Limits," *IEEE Transactions on Components, Packaging, and Manufacturing Technology, Part A*, Vol. 20, No. 2, pp. 252–256 (1997).

McCluskey, F.P., D. Das, J. Jordan, R.R. Grzybowski, J. Fink, L. Condra, and T.C. Torri, "Packaging of Electronics for High Temperature Applications," *The International Journal of Microcircuits and Electronic Packaging*, Vol. 20, No. 3, pp. 409–423 (1997).

McCluskey, F.P., R. Munamarty, and M. Pecht, "Popcorning in PBGA Packages During IR Reflow Soldering," *Microelectronics International*, No. 42, pp. 20–23 (1997).

1996

McCluskey, F.P., R.R. Grzybowski, and T.F. Podlesak, eds., "High Temperature Electronics," *CRC Press*, Boca Raton, FL (1996).

Related News

[Khaligh, McCluskey to lead new \\$2.37M DOE solar power converter project](#)

By funding these kinds of projects, DOE hopes to dramatically reduce the cost of solar energy. April 24, 2018

[Khaligh, McCluskey receive Boeing funding for more electric aircraft](#)

The team is developing the world's first wide-bandgap GaN-based modular Rectified Transformer Rectifier Units for commercial aircraft such as the Boeing 787. February 19, 2018

[Bar-Cohen Named President of IEEE Electronic Packaging Society](#)

Professor Bar-Cohen began serving in this role January 1. January 3, 2018

[McCluskey Co-PI on NSF Partnership for Innovation Grant on Electric Vehicle Technology](#)

Researchers will develop an onboard integrated charger/converter. March 25, 2016

[UMD Researchers Creating First Onboard Fast-Charging System for Electric Vehicles](#)

NSF funds innovative interdisciplinary research for Khaligh and McCluskey September 11, 2015

[UMD Students Win Poster Session at NASA's Thermal and Fluids Analysis Workshop](#)

Graduate students Allison Porter (Aerospace Engineering) and David Squiller (Mechanical Engineering) placed second and third at 2015 NASA TFAW poster session. August 13, 2015

[Invention of the Year Nominee: A New Joint Soldering Paste with High Temperature Resistance](#)

Innovation developed by McCluskey offers potential application in aviation, space exploration, and

hybrid electric vehicles April 27, 2015

UMD To Celebrate Innovations and Partnerships April 29

Nine nominees for Invention of the Year to be recognized at annual event March 23, 2015

Clark School Faculty Promotions Announced

Faculty promoted to full professor, associate professor with tenure. June 5, 2014

Offshore Wind Energy and Reliability

Clark School professors support the State of Maryland's efforts to establish a resilient wind farm. May 25, 2014

Exploring Offshore Wind Energy for Maryland

Md. Higher Education Commission funds Clark School study of reliability, cost-effectiveness of wind-generated energy. September 10, 2013

Khaligh is PI for hybrid energy storage system NSF GOALI grant

New lightweight system will offer increased battery life for electric cars. September 3, 2013

"Embedded Cooling" of Next-Generation Power Electronics

UMD Research Team wins \$2.1 million contract from DARPA to develop "embedded cooling" technology May 24, 2013

Mechanical Engineering Graduates Placed in Academia

Pedro Quintero and William McGill return to the classroom as Assistant Professors April 20, 2009

Department Well-Represented at OTC Invention Awards

Professors Baz & McCluskey earn top recognition. April 26, 2007

2006 ME Research Review Day Highlights

Research Review Day held on March 20, 2006 at the University Inn and Conference Center. February 15, 2006

Workshop on Power Device Packaging Reliability Held

Associate Professor Patrick McCluskey hosted Workshop on Power Device Packaging Reliability at UMD. June 23, 2003