

**Eric P. Guyer, Ph.D., P.E.**  
**Principal Engineer and Office Director**

**Professional Profile**

Dr. Eric Guyer is a Principal Engineer in Exponent's Materials and Corrosion Engineering practice and the Director of Exponent's Atlanta office. Dr. Guyer's areas of expertise include materials science, adhesion science and the failure of bulk materials as well as thin-films particularly as it pertains to fracture, fatigue, stress corrosion cracking, and environmentally assisted cracking. He has extensive experience investigating and solving complex multidisciplinary problems in: medical devices (e.g., active implantable devices, drug delivery systems, sterile pouches, stents), consumer products (e.g., MP3 players, smart phones, photovoltaic modules, coffee makers, heaters, remote controls), and industrial systems (boilers, pipe and plumbing components, jet engine components, floor and wall tiles). These are typically related to root cause investigations or product recalls.

Dr. Guyer is a NACE Certified Coatings Inspector and regularly conducts analyses of various paint and protective-coating systems applied to a wide variety of steel, aluminum, plastic, composite, and cementitious structures. Analyses commonly conducted involve coating selection, specification writing, and failure (delamination, cracking, blistering, chalking, color differences, mildew, efflorescence, etc.).

He previously held two academic appointments: one in the Materials Science and Engineering Department at Stanford University where he taught the course *Failure Analysis of Emerging Technologies* and the other in the Mechanical Engineering Department at Santa Clara University where he taught the course *Fracture and Fatigue of Materials*.

Prior to joining Exponent, he was employed as a Senior Materials Engineer at Lockheed Martin's Advanced Technology Center in Palo Alto (2000–2005). His research involved the oxidation kinetics of advanced high temperature ceramics as well as the fracture, mechanical and optical properties of polymer thin-films. As an undergraduate, Dr. Guyer was employed by the Dow Chemical Corporation where he examined the mechanisms of controlled drug delivery in biodegradable, pharmaceutical grade polymers.

**Academic Credentials and Professional Honors**

Postdoctoral Scholar, Materials Science and Engineering, Stanford University, 2005  
Ph.D., Materials Science and Engineering, Stanford University, 2004  
M.S., Materials Science and Engineering, Stanford University, 2003  
B.S., Chemical Engineering, Iowa State University, 2000

Electrochemical Society (ECS), San Francisco Section, Section Officer, 2006–2007  
International Interconnect Technology Conference, Best Student Paper Award, 2005

Intel Foundation Fellowship, 2004  
ECS, Dr. Daniel Cubicciotti Award, 2004  
Northern California Chapter of the American Vacuum Society, 1st Place Poster Award, 2004  
Materials Research Society, Outstanding Poster Award, 2004  
Materials Research Society, Silver Graduate Student Award, 2003  
Omega Chi Epsilon, Outstanding Senior Award, 2000  
Omega Chi Epsilon, Chemical Engineering Honor Society

### **Licenses and Certifications**

Licensed Professional Metallurgical Engineering, California, #MT1947  
Licensed Professional Mechanical Engineer, Washington, #48280  
Licensed Professional Engineer, Georgia, #PE036481  
NACE – Certified Coating Inspector Level 3, Certification #17717

### **Academic Appointments**

Lecturer, Stanford University, Department of Materials Science and Engineering  
Adjunct Lecturer, Santa Clara University, Department of Mechanical Engineering

### **Publications**

Han SM Han, Guyer EP, Nix WD. Extracting thin film hardness of extremely compliant films on stiff substrates. *Thin Solid Films*, in press. Available online December 28, 2010.

James BA, McVeigh C, Rosenbloom SN, Guyer EP, Lieberman SI. Ultrasonic cleaning-induced failures in medical devices. *Journal of Failure Analysis and Prevention* 2010; 10(3):223–227.

Guyer EP, Zednik RJ. Sterile barriers for medical devices: Failure modes and mitigation. Proceedings, ANTEC 2010, Society of Plastics Engineers, Vol. II, pp. 1925–1927, Orlando, FL, May 2010.

Guyer EP, Eiselstein L, Verghese P. Accelerated testing of active implantable medical devices. Paper No. 09464, Corrosion 2009, NACE International, Atlanta, GA, 2009.

Guyer EP, Zednik R. Sterile barriers for medical devices: Failure modes and mitigation. *Plastics Engineering* 2010; 66(9):26–31, October.

Houle FA, Guyer EP, Miller DC, Dauskardt RH. Adhesion between template materials and UV-cured nanoimprint resists. *Journal of Vacuum Science & Technology B* 2007 July/Aug; 25(4).

Joseph R, Guyer EP, Thelen R. Tired of watching paint dry? *Metal Finishing Magazine* 2007; April.

Guyer EP, Gantz J, Dauskardt RH. Aqueous solutions diffusion in hydrophobic nanoporous thin-film glasses. *Journal of Materials Research* 2007; 22, 2007.

Guyer EP, Patz M, Dauskardt RH. Fracture of nanoporous methylsilsesquioxane thin-film glasses. *Journal of Materials Research* 2006; 21(4).

Iacopi F, Travaly Y, Eyckens B, Waldfried C, Abell T, Guyer EP, Gage DM, Dauskardt RH, Sajavaara T, Houthoofd K, Grobet P, Jacobs P, Maex K. Short-ranged structural rearrangement and enhancement of mechanical properties of organosilicate glasses induced by ultraviolet radiation. *Journal of Applied Physics* 2006; 99.

Guyer EP, Dauskardt RH. Effect of solution pH on subcritical crack growth in Low-k dielectric thin-films. *Journal of Materials Research* 2005; 20(3):680–687.

Guyer EP, Dauskardt RH. Electrical technique for monitoring crack growth in thin-film fracture mechanics specimens. *Journal of Materials Research* 2004; 19(11):3139–3144.

Guyer EP, Dauskardt RH. Fracture of nanoporous thin-film glasses. *Nature Materials* 2004; 3(1):53–55.

Guyer EP. The effects of aqueous solution chemistry on the fracture of nanoporous thin-films. Ph.D. Dissertation, Leland Stanford Junior University, Stanford, CA, 158 pp., 2004.

### **Conference Proceedings**

Guyer EP, Lane M. Improving the reliability of medical device coatings. Proceedings, Medical Device Materials V, the Materials and Processes for Medical Devices Conference, 2009, pp. 35–40, Minneapolis MN, August 10–12, 2009.

James BA, McVeigh C, Rosenbloom SN, Guyer EP, Lieberman SI. Ultrasonic cleaning-induced failures in medical devices. Proceedings, Medical Device Materials V, the Materials and Processes for Medical Devices Conference, 2009, pp. 10–12, Minneapolis MN, August 10–12, 2009.

Baldwin JM, Bauer DR, Rehkopf JD, Guyer EP, Ledwith P. Degradation of VMQ silicones in engine sealing applications. Presented at the 173rd Technical Meeting of the ACS Rubber Division, Dearborn, MI, April 2008.

Houle FA, Miller DC, Guyer EP, Dauskardt EP, Rice E, Hamilton J. Adhesion between template materials and UV-cured nanoimprint resists. Proceedings, SPIE, Vol. 6153, 2006.

Gage D, Guyer EP, Stebbins J, Cui Z, Al-Bayati A, Demos A, MacWilliams K, Dauskardt RH. UV curing effects on glass structure and mechanical properties of organosilicate Low-k thin films. Proceedings, 9<sup>th</sup> Annual IEEE International Interconnect Technology Conference, Burlingame, CA, June 2006.

Guyer EP, Dauskardt RH. Effect of porosity on reducing cohesive strength and accelerating crack growth in Ultra Low-k thin-films. Proceedings, 8<sup>th</sup> Annual IEEE International Interconnect Technology Conference, Burlingame, CA, June 2005.

Dauskardt RH, Guyer EP. Accelerated debonding and cracking in thin-film structures: Chemical reaction rate and loading effects. Proceedings, 11<sup>th</sup> International Conference of Fracture, Turin, Italy, March 2005.

Guyer EP, Dauskardt RH. Accelerated cracking of nanoporous thin-film glasses in aqueous environments. Proceedings, 206<sup>th</sup> Meeting of the Electrochemical Society Conference, Honolulu, HI, October 2004.

Guyer EP, Dauskardt RH. Accelerated crack growth of nanoporous Low-k glasses in CMP slurry environments. Proceedings, 7<sup>th</sup> IEEE International Interconnect Technology Conference, Burlingame, CA, June 2004.

Guyer EP, Dauskardt RH. Effect of aqueous solution chemistry on the accelerated cracking of lithographically patterned arrays of copper and nanoporous thin-films. Proceedings, Spring Materials Research Society Conference, Symposium F, San Francisco, CA, April 2004.

Guyer EP, Dauskardt RH. Effect of CMP slurry environments on subcritical crack growth in ultra Low-k dielectric materials. Proceedings, 6<sup>th</sup> Annual IEEE International Interconnect Technology Conference, Burlingame, CA, June 2003.

### **Presentations and Published Abstracts**

Guyer EP, Pan Z. Specialty inorganic materials: Advances in metals and ceramics. Medical Design & Manufacturing West, Anaheim, CA, February 2011.

Guyer EP, Zednik RJ. Sterile barriers for medical devices: Failure modes and mitigation, ANTEC 2010, Society of Plastics Engineers, Orlando, FL, May 2010.

Guyer EP, Lane M. Improving the reliability of medical device coatings, Medical Device Materials V, the Materials and Processes for Medical Devices Conference, Minneapolis MN, August 10–12, 2009.

Guyer EP, Eiselstein L, Verghese P. Accelerated testing of active implantable medical devices, Corrosion 2009, NACE International, Atlanta, GA, 2009.

Guyer EP. Adhesion of thin-films. Medical Device Task Force, Tempe, AZ, November 2006.

Guyer EP. Environmentally assisted crack growth in thin-films. Medical Device Task Force, Tempe, AZ, November 2006.

Guyer EP, Dauskardt RH. Effect of chemically active environments on accelerated crack growth in Low-k dielectric thin-films. Northern California Chapter of the American Vacuum Society CMP Users Group, Sunnyvale, CA, March 2004.

### **Professional Affiliations**

- Materials Research Society—MRS
- Electrochemical Society
- The Society for Protective Coatings—SSPC
- National Association of Corrosion Engineers—NACE
- American Society for Metals—ASM