

Curriculum Vitae
Qiang Huang

Assistant Professor
University of Alabama
Tuscaloosa, AL 35487

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EDUCATION

- 05/2004 Ph.D. in Chemical Engineering
Louisiana State University (LSU)
Dissertation: Electrodeposition of FeCoNiCu Quaternary System
- 06/1997 B.E. in Chemical Engineering
Zhejiang University, Hangzhou, China

HONOR/AWARDS

- 2014 Outstand Technical Achievement Award, IBM
2013 IBM Research Division Accomplishment Award
2013 IBM Unit Process Eminence and Excellence Award
2007 – 2015 10 High Value Invention Awards, IBM
2006 – 2015 8 Invention Achievement Plateau Awards, IBM
2004 Outstanding Dissertation Award, LSU
2004 Best Dissertation Award, AICHE Baton Rouge Chapter
2002 Charles Coates Dissertation Fellowship, LSU
1997 Graduation of Honor College, Zhejiang University

RESEARCH EXPERIENCE

- 01/2016 – present *Assistant Professor*
University of Alabama, Tuscaloosa, AL
- 08/2006 – 12/2015 *Research Staff Member and Project Manager*
IBM TJ Watson Research Center, Yorktown Heights, NY
- 07/2004 – 07/2006 *Postdoctoral Researcher*
IBM TJ Watson Research Center, Yorktown Heights, NY
- 08/1999 – 06/2004 *Research Assistant,*
Louisiana State University, Baton Rouge, LA
- 06/2003 – 08/2003 *Research Intern,*
Lakeshore Cryotronics Inc., Westerville, OH
- 10/1996 – 06/1997 *Research Assistant,*
Zhejiang University, Hangzhou, China

COMMERCIALIZED PRODUCTS

CUPUR™ Alpha 3000, 3010, and 3060 Cu damascene chemistries for advanced Cu BEOL interconnects manufacturing (three chemistries commercialized by BASF).

CUPUR™ Alpha 4000, 4030, and 4050 levelers for advanced Cu BEOL interconnects manufacturing (three additional levelers commercialized by BASF).

SCALED-UP MANUFACTURING PROCESSES

Manufacturing processes for Cu BEOL interconnects for 22 nm and 14 nm technologies, implemented at IBM Microelectronics (now GlobalFoundries), NY.

Pilot manufacturing processes for Cu(InGa)Se₂ thin film solar cells, implemented at NEXCIS, France.

Pilot development processes for Cu front grid manufacturing for crystalline Si solar cells implemented at REC Solar, Singapore.

PROFESSIONAL AFFILIATION

The Electrochemical Society, 2000 – present.

Material Research Society, 2003 – present.

Sigma Xi, 2007 – present.

PUBLICATIONS (* denotes the corresponding author)

1. Q. Huang*, T. Lyons, and W. Sides, “Electrodeposition of Cobalt for Interconnect Application: Effect of Dimethylglyoxime”, *Journal of the Electrochemical Society*, 163(13) D715, 2016.
2. Q. Huang*, K. Reuter, Y. Zhu, and V. Deline, “A Study on the Long-Term Degradation of Silicon Photovoltaic Cells Metallized with Electroplated Cu and Silicide”, *ECS Journal of Solid State Science and Technology*, 5(2), Q24, 2016.
3. Q. Huang*, “A Study on the Electrodeposition and Silicidation of NiCo Alloys for Silicon Photovoltaic Cell Metalization”, *ECS Journal of Solid State Science and Technology*, P51, 5(2), 2016.
4. Q. Huang*, S. S. Papa Rao, and K. Fisher, “Light Assisted Electrodeposition and Silicidation of Ni for Crystalline Silicon Photovoltaic Cell Metallization”, *ECS Journal of Solid State Science and Technology*, 4(8), Q75, 2015.
5. S. Kitayaporn*, Q. Huang, M. Hopstaken, and B. Baker-O’Neal, “Impurity Induced Incorporation of Sn during Cu Damascene Plating”, *Journal of the Electrochemical Society*, 162, D74, 2015.
6. A. Sahin*, Q. Huang, J. Cotte, and B. Baker-O’Neal, “Electrochemical Palladium

Deposition for Reducing Critical Dimension in Nanostructures”, *Journal of the Electrochemical Society*, 161, D697, 2014.

7. Q. Huang*, A. Avekians, S. Ahmed, C. Parks, B. Baker-O’Neal, S. Kitayaporn, A. Sahin, Y. Sun, T. Cheng, “Impurity in the Electrodeposited Sub-50 nm Cu Lines: the Effect of Additives”, *Journal of the Electrochemical Society*, 161, D388, 2014.
8. D. Liang, J. Liu, K. Reuter, B. Baker-O’Neal, Q. Huang*, “Electroplating of NiFe Alloys in Sub-50 nm Lines”, *Journal of the Electrochemical Society*, 161, D301, 2014.
9. Q. Huang*, J. Liu, and B. Baker-O’Neal, “An Electrochemical Method of Suppressor Screening for Cu Plating in sub-100 nm Lines”, *Journal of the Electrochemical Society*, 161, D207, 2014.
10. Q. Huang*, B. Baker-O’Neal, C. Cabral, E. Simonyi, V.R. Deline, and M. Hopstaken, “Enhanced Grain Growth of Electroplated Copper on Cobalt-containing Substrates”, *Journal of the Electrochemical Society*, 160, D3045, 2013.
11. Q. Huang*, B. Baker-O’Neal, C. Parks, M. Hopstaken, A. Fluegel, C. Emnet, M. Arnold and D. Mayer, “Leveler Effect and Oscillatory Behavior during Copper Electroplating”, *Journal of the Electrochemical Society*, 159, D526, 2012.
12. S. Ahmed*, K.B. Reuter, Q. Huang, H. Deligianni, L.T. Romankiw, S. Jaime and P.P. Grand, “Electrodeposited Gallium Alloy Thin Films Synthesized by Solid State Reactions for CIGS Solar Cell”, *Journal of the Electrochemical Society*, 159, D129, 2012.
13. Q. Huang*, K. Reuter, S. Ahmed, L. Deligianni, L. T. Romankiw, S. Jaimes, P.-P. Grand, and V. Charrier, “Electrodeposition of Indium on Copper for CIS / CIGS Solar Cell Applications”, *Journal of the Electrochemical Society*, 158, D57, 2011.
14. S. S. Papa Rao*, K. Fisher, D. Neumayer, Q. Huang, K. Kwietniak, J. Liu, J. Vichiconti, J. Nalskowski, J. Newbury, A. Pyzyna, S. Rossnagel, G. Totir, and N. Fuller, “Development and Characterization of Advanced Processes Technologies for the Fabrication of Crystalline Si Solar Cells”, *Proceeding of 35th IEEE PVSC*, 2010.
15. Q. Huang*, B. Baker-O’Neal, J. J. Kelly, P. Broekmann, A. Wirth, C. Emnet, M. Martin, M. Hahn, A. Wagner, and D. Mayer, “Suppressor and Accelerator Behaviors during Copper Super Fill in Sub-100 nm Features”, *Electrochemical and Solid State Letters*, 11(4), D27, 2009.
16. (Book Chapter) D. Million, Q. Huang, and Y. Zhu, “Novel Deposition Methods”, in *Phase Change Materials: Science and Applications*, Springer, 2009.
17. J. J. Kelly*, T. Vo, O. Van de Straten, Q. Huang, B. Baker-O’Neal, I. Shao, S. Chiang, and J. Dukovic, “Morphology of Electrodeposited Cu on 300 nm PEALD Ruthenium”, *ECS transaction*, 16(4), 201 2008.
18. V. Venkatasamy*, I. Shao, Q. Huang, and J. L. Stickney, “ALD Approach towards

Electrodeposition of Sb₂Te₃ for Phase-Change Memory Applications”, *Journal of the Electrochemical Society*, 155(11), D693, 2008.

19. Q. Huang*, A. J. Kellock and S. Raoux, “Electrodeposition of SbTe Phase Change Alloys”, *Journal of the Electrochemical Society*, 155(2), D104, 2008.
20. Q. Huang*, S. Bedell, K. Saenger, M. Copel, H. Deligianni, and L. T. Romankiw, “Single Crystal Germanium Thin Film from Electrodeposition of Solid Phase Epitaxy”, *Electrochemical and Solid State Letters*, 10(11), D124, 2007.
21. Q. Huang*, H. Deligianni, and L. T. Romankiw, “Anisotropic Growth of Nanostructures in Germanium Electroplating”, *Electrochemical and Solid State Letters*, 10(11), D 121, 2007.
22. Q. Huang*, C. Bonhöte, J. Lam, L. T. Romankiw, “FeCo/Cu and FeCo/Ru Laminated Structures by Electroplating”, *ECS Transactions*, 3(25), 143, 2007.
23. Q. Huang*, C. Bonhöte, J. Lam, and L. T. Romankiw, “The Electrodeposition of FeCoRu Alloy”, *ECS Transactions*, 3(25), 61, 2007.
24. Q. Huang*, H. Deligianni, and L. T. Romankiw, “Electrodeposition of Gold on Silicon”, *ECS Transactions*, 2(6), 299, 2006.
25. (Book Chapter) E. J. Podlaha, Y. Li, J. Zhang, Q. Huang, A. Panda, A. Lozano-Morales, D. Davis, and Z. Guo, “Electrochemical Deposition of Nanostructured Metals”, in *Handbook of Nanomaterials*, CRC Press, New York, 2006.
26. Q. Huang, D. Davis and E. J. Podlaha*, “Electrodeposition of FeCoNiCu Nanowires”, *Journal of Applied Electrochemistry*, 36(8), 871, 2006.
27. Q. Huang, H. Deligianni*, and L. T. Romankiw, “Electrodeposition of Gold on Silicon, Nucleation and Growth Phenomena”, *Journal of the Electrochemical Society*, 153(5), C322, 2006.
28. Q. Huang, and E. J. Podlaha*, “Selective Etching of FeCoNiCu/Cu Multilayers”, *Journal of Applied Electrochemistry*, 35(11), 1127, 2005.
29. Che-Yih Lim, Q. Huang, X. Xie, A. Safir, S. A. Harfenist, R. Cohn and E. J. Podlaha*, “Development of an Electrodeposited Nanomold from Compositionally Modulated Alloys”, *Journal of Applied Electrochemistry*, 34(8), 857, 2004.
30. Q. Huang and E. J. Podlaha*, “Simulation of Pulsed Electrodeposition for GMR FeCoNiCu/Cu Multilayers”, *Journal of the Electrochemical Society*, 151(1), C119, 2004.
31. Q. Huang, D. P. Young and E. J. Podlaha*, “Magnetoresistance in Electrodeposited Iron-Cobalt- Nickel-Copper Multilayers”, *Journal of Applied Physics*, 94(8), 1864, 2003.
32. Q. Huang and E. J. Podlaha*, “A Model to Describe Pulsed Electrodeposition of GMR

FeCoNiCu Alloys”, *Proceedings of Seventh International Symposium on Magnetic Materials, Processes and Devices*, The Electrochemical Society, Pennington, NJ, PV 2002-27, 414, 2003.

33. Q. Huang, D. P. Young, J. Y. Chan, J. Jiang and E. J. Podlaha*, “Electrodeposition of FeCoNiCu Compositionally Modulated Multilayer”, *Journal of the Electrochemical Society*, 149(6), C349, 2002.

PATENTS

1. S. Ahmed, H. Deligianni, Q. Huang, K. Reuter, L. T. Romankiw, and R. Vaidyanathan, “Electrodeposition Methods of Gallium and Gallium Alloy Films and Related Photovoltaic Structures”, US Patent 9,401,443 (2016).
2. S. Ahmed, H. Deligianni, Q. Huang, L. T. Romankiw, and R. Vaidyanathan, “Pressure Transfer Process for Thin Film Solar Cell Fabrication”, US Patent 9,293,632 (2016).
3. K. Fisher, Q. Huang, and S. S. Papa Rao, “Use of Phosphorus in Metallization of Photovoltaic Devices and Method of Fabricating Same”, US Patent 9,284,656 (2016).
4. K. Fisher, Q. Huang, S. S. Papa Rao, and M. Yeh, “Photovoltaic Device with Aluminum Plated Back Surface Field and Method of Forming Same”, US Patent 9,246,024 (2016).
5. K. Fisher, Q. Huang, and S. S. Papa Rao, “Processes for Uniform Metal Semiconductor Alloy Formation for Front Side Contact Metallization and Photovoltaic Device Formed Therefrom”, US Patent 8,969,122 (2015).
6. K. C. Fisher, H. Hovel, Q. Huang, S. Huang, Y. Kim, and S. S. Papa Rao, “Integration of a Titania Layer in an Anti-reflective Coating for Si Photovoltaic Cell”, US Patent 8,962,374 (2015).
7. K. C. Fisher, H. Hovel, Q. Huang, S. Huang, Y. Kim, and S. S. Papa Rao, “Integration of a Titania Layer in an Anti-reflective Coating for Si Photovoltaic Cell”, US Patent 8,946,844 (2015).
8. Q. Huang and B. Baker-O’Neal, “Photovoltaic Cells with Copper Grid”, US Patent 8,901,414 (2014).
9. Q. Huang, “Photovoltaic Devices with Metal Semiconductor Alloy Metallization”, US Patent 8,884,159 (2014).
10. H. Hovel, Q. Huang, X. Shao, J. Vinchiconti, and G. Walker, “Super-lattice / Quantum Well Nanowires”, US patent 8,878,259 (2014).
11. C. Cabral, J. Gambino, Q. Huang, T. Nogami, and K. Rodbell, “Microstructure Modification in Copper Interconnect Structures Using Manganese”, US patent 8,828,870 (2014).
12. S. Bedell, H. Deligianni, Q. Huang, L. T. Romankiw, and K. Saenger, “Electrodeposition Method for Forming Germanium on Semiconductor Substrates”, US patent 8,823,143 (2014).
13. Q. Huang, J. Liu, and Y. Kim, “Buried Selective Emitter Formation for Photovoltaic Devices Utilizing Metal Nanoparticle Catalyzed Etching”, US Patent 8,759,139 (2014).

14. H. Deligianni, Q. Huang, and L. T. Romankiw, "Vertical Nanowire FET Devices", US patent 8,637,849 (2014).
15. C. Cabral, J. Gambino, Q. Huang, T. Nogami, and K. Rodbell, "Microstructure Modification in Copper Interconnect Structures Using Manganese", US patent 8,492,897 (2013).
16. H. Hovel, Q. Huang, X. Shao, J. Vinchiconti, and G. Walker, "Super-lattice / Quantum Well Nanowires", US patent 8,273,591 (2012).
17. H. Deligianni, Q. Huang, J. Hummel, L. T. Romankiw, and M. Rothwell, "Formation of Vertical Devices by Electroplating", US patent 8,247,905 (2012).
18. G. Cohen, H. Deligianni, Q. Huang, and L. T. Romankiw, "Self-constrained Anisotropic Germanium Nanostructure from Electroplating", 8,115,191 (2012).
19. S. Ahmed, H. Deligianni, P. Grand, Q. Huang, S. Jaime, M. Mason, K. Reuter, E. Roche, L. T. Romankiw, R. Vaidyanathan, and D. Zupanski-Nielsen, "Improved Interface between a I-III-VI₂ Material Layer and a Molybdenum Substrate", WO patent 2012089558 (2012).
20. B. Baker-O'Neal, C. Cabral, Q. Huang, and K. Rodbell, "Microstructure Modification in Copper Interconnect Structures Using Cobalt", US patent 8,008,199 (2011).
21. Q. Huang, A. J. Kellock, X. Shao and V. Venkatasamy, "Method of Electrodepositing Germanium Compound Materials on a Substrate", US patent 7,918,984 (2011).
22. H. Deligianni, Q. Huang, and L. T. Romankiw, "Methods of Manufacture of Vertical Nanowire FET Devices", US patent 7,892,956 (2011).
23. B. Baker-O'Neal, C. Cabral, Q. Huang, and K. Rodbell, "Microstructure Modification in Copper Interconnect Structures Using Cobalt", US patent 7,843,063 (2010).
24. S. Bedell, H. Deligianni, Q. Huang, L. T. Romankiw, and K. Saenger, "Structures Containing Electrodeposited Germanium and Methods for Their Fabrication", US patent 7,785,982 (2010).
25. H. Deliganni, Q. Huang, and L. T. Romankiw, "Formation of Nanostructures Comprising Compositionally Modulated Ferromagnetic Layers by Pulsed ECD", US patent 7,736,753 (2010).
26. G. Cohen, H. Deligianni, Q. Huang, and L. T. Romankiw, "Self-constrained Anisotropic Germanium Nanostructure from Electroplating", US patent 7,659,200 (2010).
27. B. Cedric, P. Grand, Q. Huang, S. Jaime, and K. Reuter, "Production of a Multi-layer Structure for Photovoltaic Use with Perfected Electrolysis Conditions", FR patent 2955428 (2010).
28. H. Deligianni, Q. Huang, J. Hummel, L. T. Romankiw, and M. Rothwell, "Formation of Vertical Devices by Electroplating", US patent 7,608,538 (2009).
29. H. Deligianni, Q. Huang, and L. T. Romankiw, "Memory Storage Devices Comprising Different Ferromagnetic Material Layers and Methods of Making and Using the Same", US patent 7,539,051 (2009).

PATENT PENDING / DISCLOSURES

30. Q. Huang, K. Rodbell, A. Sahin, “Chemically Strengthened Glasses and the Method of Making the Same”, US Patent Application (2016, pending).
31. P. Andry, Q. Huang, Y. Luo, A. Naganathan, “Micro Battery Design and Diagnosis”, US Patent Application (2016, pending).
32. B. Baker-O’Neal, J. M. Cotte, R. Goldblatt, J. Hedrick, Q. Huang, S. Huang, L. L. Kosbar, C. Lavoie, S. Chong, H. Lam, R. Steeman, “A Process for Fabricating Photovoltaics Using a Metal Plated Front Grid with Improved Adhesion”, US Patent Application (2015, pending).
33. B. Baker-O’Neal, J. M. Cotte, R. Goldblatt, J. Hedrick, Q. Huang, S. Huang, L. L. Kosbar, S. Chong, H. Lam, R. Steeman, “Laser Patterned Structures of Photovoltaic Busbar for Optimal Adhesion of Plated Metal Grids”, US Patent Application (2015, pending).
34. C. Cabral, F. E. Doany, G. Fritz, M. Gordon, Q. Huang, E. P. Lewandowski, X. H. Liu, K. Rodbell, T. M. Shaw, “Controlling Fragmentation of Chemically Strengthened Glass”, US Patent Application 20160137548 (pending).
35. B. Baker-O’Neal, J. M. Cotte, R. Goldblatt, J. Hedrick, Q. Huang, S. Huang, L. L. Kosbar, C. Lavoie, X. Shao, R. Steeman, “Manufacture and Structure for Photovoltaics including Metal-Rich Silicide”, US Patent Application 20150325716 (pending).
36. B. Baker-O’Neal, J. M. Cotte, R. Goldblatt, J. Hedrick, Q. Huang, S. Huang, L. L. Kosbar, S. Chong, R. Utama, R. Steeman, “Surface Preparation and Uniform Plating on Through Wafer Vias and Interconnects for Photovoltaics”, US Patent Application 20150280022 (pending).
37. Q. Huang, J. Liu, and Y. Kim, “Inverted Pyramid Texture Formation on Single Crystalline Silicon”, US Patent Application 20130025663 (pending).
38. S. Ahmed, S. Grunow, Q. Huang, and C. Tsung, “Method and System to Develop a Hybrid Contact Via (CA) Plug without Seams or Voids using Electroplating”, IP disclosure number IPCOM000239407D.
39. S. Ahmed, P. De Gasquet, H. Deligianni, P. Grand, Q. Huang, S. Jaime, L. T. Romankiw, and R. Vaidyanathan, “Checking the Stoichiometry of I-III_VI Layers for Use in Photovoltaics Using Improved Electrolysis Conditions”, WO patent application 2012052657.
40. Q. Huang, A. Kellock, X. Shao, “Bath for Electroplating a I-III-VI Compound, Use Thereof and Structures Containing Same”, US Patent Application 20100213073.
41. Q. Huang, X. Shao, J. L. Stickney, and V. Venkatasamy, “Method of Making Phase Change Materials by Electrochemical Atomic Layer Deposition”, US patent application 20090011577.
42. G. Cohen, H. Deligianni, Q. Huang, and L. T. Romankiw, “Self-Aligned Epitaxial Growth of Semiconductor Nanowires”, US Patent Application 20080191317.

PRESENTATIONS (presented by Q. Huang)

1. Q. Huang, K. Ramsey, W. Sides, "Anodization of Aluminum Alloys with In, Sn and Ag", *230th Meeting of the Electrochemical Society*, Honolulu, HI, Oct 2016.
2. Q. Huang "Electrochemical Engineering for Material and Device Fabrication", *Center for Materials for Information Technology, University of Alabama*, AL, April 2016.
3. Q. Huang, K. Reuter, Y. Zhu, V. Deline, "Long Term Degradation of Silicon Solar Cell Metallized with Cu Electrodeposition", *228th Meeting of the Electrochemical Society*, Pheonix, AZ, Oct 2015.
4. Q. Huang, S. S. Papa Rao, and K. Fisher, "Light Assisted Electrodeposition and Salicidation for Silicon Solar Cell Metallization", *228th Meeting of the Electrochemical Society*, Pheonix, AZ, Oct 2015.
5. (invited) Q. Huang, "Electrodeposition of Nanomaterials for Semiconductor Applications", *Kunming University of Science and Technology*, Kunming, China, Sept 2015.
6. (invited) Q. Huang, "Electrodeposition of Nanomaterials for Semiconductor Applications", *Suzhou Institute of Nano-Tech and Nano-Bionics*, Suzhou, China, Sept 2015.
7. (invited) Q. Huang, "Electrodeposition of Nanomaterials for Semiconductor Applications", *University of Philippines*, Manila, Republic of the Philippines, Aug 2015.
8. (invited) Q. Huang, "Electrodeposition of Nanomaterials for Information Technology Applications", *Michigan Technology University*, Houghton, MI, Feb 2015.
9. (invited) Q. Huang, "Electrodeposition of Nanomaterials for Information Technology Applications", *University of Alabama*, Tuscaloosa, AL, Jan 2015.
10. Q. Huang, "Long Term Degradation of Crystalline Silicon Solar Cells with Electroplated Cu Grids", *226th Meeting of the Electrochemical Society*, Cancun, Mexico, Oct 2014.
11. (invited) Q. Huang, S. Ahmed, B. Baker-O'Neal, T. Cheng, J. Kelly, S. Kitayaporn, J. Liu, A. Sahin, and Y. Sun, "The Development of a Chemistry and Process for Cu Damascene Plating – from Research to Development to Manufacturing", *226th Meeting of the Electrochemical Society*, Cancun, Mexico, Oct 2014.
12. Q. Huang, A. Avekians, S. Ahmed, C. Parks, B. Baker-O'Neal and T. Cheng, "Impurity in the Electrodeposited sub-50 nm Cu Lines: the Effect of Plating Chemistry", *226th Meeting of the Electrochemical Society*, Cancun, Mexico, Oct 2014.
13. (invited) Q. Huang, "The Development of a Chemistry and Process for Cu Damascene Plating – from Research to Development to Manufacturing", *Enthone Inc.*, West Haven, CT, Aug 2014.
14. Q. Huang, B. Baker-O'Neal and S. Ahmed, "Electrochemical Characterization of Screen

Printed Au Electrodes”, *224th Meeting of the Electrochemical Society*, San Francisco, CA, Oct 2013.

15. (invited) Q. Huang, “Cu Electrodeposition for BEOL Interconnects”, *IBM Material Research Council Seminar*, IBM, April 2013.
16. (invited) Q. Huang, B. Baker-O’Neal, J. Kelly and C. Cabral, “Additive Behavior in Cu Electroplating and the Recrystallization of Plated Cu”, *220th Meeting of the Electrochemical Society*, Boston, MA, Oct 2011.
17. Q. Huang, K. Reuter, S. Ahmed, L.T. Romankiw, R. Vaidyanathan, H. Deligianni, M. Mason, D. Nielsen, S. Jaime, P.P. Grand, V. Charrier and P. de Gasquet, “Electrodeposition of Indium on Copper for CIS/CIGS Solar Cell Applications”, *218th Meeting of the Electrochemical Society*, Las Vegas, NV, Oct 2010.
18. Q. Huang, B. Baker-O’Neal, C. Parks, M. Hopstaken, C. Cabral, J. Kelly, K. Kwietniak, P. Broekmann, A. Spaenig, M. Arnold, C. Emnet, A. Wirth, C. Roeger, A. Wagner, M. Hahn and D. Mayer, “Oscillatory Behavior in Copper Plating and Nanometric Multilayer Structures”, *216th International Meeting of the Electrochemical Society*, Viena, Oct 2009.
19. Q. Huang, A. Kellock, S. Raoux, R. Shelby, C. Cabral, “Electrodeposition of SbTe Alloys for Phase Change Applications”, *214th International Meeting of the Electrochemical Society*, Honolulu HI, Oct 2008.
20. Q. Huang, H. Deligianni, L. T. Romankiw, “Electrodeposition of Compositionally Modulated Magnetic Nanowires for Spintronics Based Memory Devices”, *214th International Meeting of the Electrochemical Society*, Honolulu HI, Oct 2008.
21. Q. Huang, B. Baker-O’Neal, “Accelerator and Suppressor Behavior during Copper Superfilling of Sub-100 nm Features”, *214th International Meeting of the Electrochemical Society*, Honolulu HI, Oct 2008.
22. Q. Huang, H. Deligianni, L. T. Romankiw, “Electrodeposition of Germanium Nanostructures”, *212th International Meeting of the Electrochemical Society*, Washington DC, Oct 2007.
23. Q. Huang, C. Bonhöte, J. Lam, L. T. Romankiw, “The Electrodeposition of FeCoRu Alloy System”, *210th International Meeting of the Electrochemical Society*, Cancun, Mexico, Nov 2006.
24. Q. Huang, C. Bonhöte, J. Lam, L. T. Romankiw, “FeCo/Cu and FeCo/Ru Laminated Structures from Electroplating”, *210th International Meeting of the Electrochemical Society*, Cancun, Mexico, Nov 2006.
25. Q. Huang, H. Deligianni, L. T. Romankiw, “Electrodeposition of Gold on Silicon” *209th International Meeting of the Electrochemical Society*, Denver, CO, USA, May 2006.
26. Q. Huang, R. W. Cohn and E. J. Podlaha “Electrodeposited FeCoNiCu Nanostructures”,

204th National Meeting of the Electrochemical Society, Orlando, FL, USA, Oct 2003.

27. Q. Huang and E. J. Podlaha, "A Model to Describe Pulsed Electrodeposition of GMR FeCoNiCu Alloys", 202nd National Meeting of the Electrochemical Society, Salt Lake City, UT, USA, Oct 2002.

28. Q. Huang (poster) J. Y. Chan, D. P. Young and E. J. Podlaha, "Electrodeposition and Characterization of FeCoNi/Cu Nanometric Multilayers", *International Workshop on Nanocomposites, Nanomaterials and Nanotechnology*, Argonne, IL, USA, Mar 2002.

29. Q. Huang (poster) and E. J. Podlaha, "Electrodeposition of FeCoNiCu Quaternary Alloys", 200th International Meeting of the Electrochemical Society, San Francisco, CA, USA, Sep 2001.

PRESENTATIONS (presented by students)

1. T. W. Lyons (poster), W. D. Sides, and Q. Huang, "Electrodeposition of Cobalt for Interconnect Applications", 2016 AICHE Annual Meeting, San Francisco, CA, Nov 2016.
2. W. D. Sides (poster) and Q. Huang, "Electrochemical Nucleation of SbTe Phase Change Compound", 2016 Workshop of Material for Information Technology, University of Alabama, Tuscaloosa, AL, Oct 2016.
3. T. W. Lyons (poster) and Q. Huang, "Electrochemical Nucleation of SbTe Phase Change Compound", 2016 Workshop of Material for Information Technology, University of Alabama, Tuscaloosa, AL, Oct 2016.

CONTRIBUTED PRESENTATIONS (presented by colleagues)

1. S. Ahmed, Q. Huang, T. Cheng, P. Findeis, D. R. Koli, C. N. Truong and S. Grunow, "Damascene Copper Plating Recipe Engineering for Defectivity, Health of Line (HOL) and Reliability Improvement", 230th Meeting of the Electrochemical Society, Honolulu, HI, Oct 2016.
2. H. Deligianni, S. Ahmed, Q. Huang and L.T. Romankiw, "Electrodeposited Thin Film Solar Cells", 226th Meeting of the Electrochemical Society, Cancun, Mexico, Oct 2014.
3. A. Sahin, J.M. Cotte, Q. Huang and B. Baker-O'Neal, "Electrochemical Palladium Deposition on Titanium Nitride, Ruthenium and Palladium Substrates for Nanoscale Device Fabrication", 225th Meeting of the Electrochemical Society, Orlando, FL, May 2014.
4. S. Ahmed, Q. Huang, T. Cheng, P. Findeis, C.R. Cruszechi, A.H. Simon, P.S. McLaughlin, N.C.N. Truong, B. Baker-O'Neal, S.L. Grunow, M.P. Chudzik, and S. Grunow, "Wafer Scale Cu Plating Process Optimization for Defectivity Improvement", 225th Meeting of the Electrochemical Society, Orlando, FL, May 2014.
5. S. Kitayaporn, M. Hopstaken, Q. Huang and B. Baker-O'Neal, "Impurity Induced Tin

Incorporation during Copper Electrodeposition”, *224th Meeting of the Electrochemical Society*, San Francisco, CA, Oct 2013.

6. J. Kelly, X. Lin, T. Nogami, O. van der Straten, J. Demarest, J. Li, R. Murphy, P. DeHaven, X. Zhang, C. Penny, Q. Huang and D. Edelstein, “Effect of Bath Chemistry On Electrodeposited Cu Morphology Using Thin PVD Cu Seed”, *224th Meeting of the Electrochemical Society*, San Francisco, CA, Oct 2013.
7. H. Deligianni, Q. Huang, L.T. Romankiw, R. Vaidyanathan, S. Ahmed, S. Jaime and P.P. Grand, V. Charrier, and O. Kerrec, “Future Challenges in Electrochemical Engineering from Microelectronics to Solar Thin Films”, *217th Meeting of the Electrochemical Society*, Vancouver, Canada, Apr 2010.
8. S. Ahmed, H. Deligianni, Q. Huang, K. Reuter, L.T. Romankiw, S. Jaime and P.P. Grand, “Study of Ga Thin Film Alloying during Self-annealing”, *218th Meeting of the Electrochemical Society*, Las Vegas, NV, Oct 2010.
9. C. Cabral, B. Fletcher, S. Rosnagel, C. K. Hu, B. Baker-O’Neal, Q. Huang, O. Vander Straten, S. Nitta, K. Rodbell and D. Edelstein, “Metallization Opportunities and Challenges for Future Back-End-of-the-Line Technology”, *Advanced Metallization Conference*, Albany, NY, 2010.
10. A. Spaenig, M. Arnold, C. Emnet, A. Wagner, M. Hahn, D. Mayer, B. Baker-O’Neal, Q. Huang, J. Kelly and P. Broekmann, “Impact of Current Density on Copper Deposition Kinetics”, *216th International Meeting of the Electrochemical Society*, Viena, Oct 2009.
11. H. Deligianni, B. Baker-O’Neal, Q. Huang, J.J. Kelly, X. Shao and L.T. Romankiw, “Electrochemical Processes in Micro and Nano Electronics”, *215th Meeting of the Electrochemical Society*, Montreal, May 2009
12. J. Kelly, T. Vo, O. van der Straten, Q. Huang, B. Baker-O’Neal, X.I. Shao, S. Chiang and J. Dukovic, “Morphology of Electrodeposited Cu on 300 mm PEALD Ru Substrates”, *214th International Meeting of the Electrochemical Society*, Honolulu HI, Oct 2008.
13. P. Broekmann, A. Wirth, M. Martin, T. Haag, M. Hahn, A Wagner, D. Mayer, Q. Huang, B. Baker-O’Neal, K. Kwietniak, J. Kelly and J. Hedrick, “Synergistic Additive-Additive Interactions in the Copper Electroplating Process”, *214th International Meeting of the Electrochemical Society*, Honolulu HI, Oct 2008
14. E. J. Podlaha, Q. Huang, J. Zhang, Y. Li, D. Davis, M. Guan, M. Moldovan and D. Young, “Electrodeposition of Iron Group Multilayer Thin Film and Nanowires”, *206th International Meeting of the Electrochemical Society*, Honolulu, HI, USA, Oct 2004.
15. E. J. Podlaha, Y. Li, Q. Huang, E. Lawson, J. Y. Chan, J. Zhang, M. Moldovan, D. P. Young, D. Palaparti and M. C. Murphy, “Electrodeposited GMR Multilayer Thin Films, Nanowires, and Micro- Posts”, *Material Research Society Meeting*, Boston, MA, Dec 2003.

16. E. J. Podlaha, A. Panda, Q. Huang and M. Murphy, "Electrodeposition of Ni Alloys and Nanocomposites for MEMS" *Gordon Conference on Electrodeposition*, New London, NH, Aug 2002.

TEACHING EXPERIENCE

University of Alabama

CHE 354 Chemical Reaction Engineering and Reactor Design

Spring / Fall 2016, Spring 2017

CHE 492 Electrochemical Engineering

Fall 2016, 2017

CHE 325 Electrochemical Engineering for Photovoltaics, Fuel Cells and Batteries

Spring 2017

Prior to UA

Polymer Science and Kitchen Chemistry teacher for 4 – 5th grade students, IBM Family Science Saturday, two classes every spring for 2011, 2013, 2014, 2015.

Teaching Assistant, Department of Chemical Engineering, LSU, 1999 – 2003

Biology teacher for 7th and 8th grade, No. 3 Middle School, Suzhou, China, 07/1997 – 06/1998.

MENTORING EXPERIENCE

Mentor for PhD (at UA)

William Sides, 2016 – present

Joseph Ortenero, 2016 -

Mentor for undergraduate researchers (at UA)

Tyler Lyons, Ryan Morelock, Kyle Pecot, Keaton Ramsey, 2016 – present

Christopher Menas, Jessica Stershic, 2016 – present

Mentor for postdoctoral researchers (at IBM)

Xiaoxuan Sun, 2015 – 2015; Adele Pacquette, 2015 – 2015; Asli Sahin, 2013 – 2015; Sathana Kitayaporn, 2012 – 2014; Jun Liu, 2011 – 2012; Shafaat Ahmed, 2009 – 2011; Zhu Liu, 2008 – 2009.

Mentor for summer intern students (at IBM)

Feng Qiao, Columbia University, 2013; Defu Liang, University of Virginia, 2011; Ming-Ling Yeh, Johns Hopkins University, 2010; Chandru Thambidurai, University of Georgia, 2008; Venkatram Venkatasamy, University of Georgia, 2006

COLLABORATIONS

Dr. Shafaat Ahmed, Global Foundries, Malta, NY.

Dr. Jinming Cai, Department of Materials Science and Engineering, Kunming University of Science and Technology, China.

Dr. Robert Cammarata, Department of Materials Science and Engineering, Johns Hopkins University, 2015.

Dr. Joey Ocon, Department of Chemical Engineering, University of Philippines, Republic of the Philippines.

Dr. Yan Zhu, Department of Materials Science and Engineering, Kunming University of Science and Technology, China.

REFEREED JOURNALS

Electrochimica Acta

Electrochemical and Solid State Letters

Electrochemistry Communications

IEEE Transactions on Device and Materials Reliability

Journal of Applied Electrochemistry

Journal of Electroanalytical Chemistry

Journal of the Electrochemical Society

Journal of Magnetism and Magnetic Materials

Journal of Physical Chemistry

Langmuir

Materials Chemistry and Physics

RCS Advances

Surface Coating and Technology

Surface Science

Thin Solid Films

PROFESSIONAL SOCIETY SERVICES

Chair, Symposium on Electrodeposition for Additive Manufacturing, 334th Electrochemical Society Meeting, Cancun, Mexico, October 2018.

Co-chair, Symposium on Novel Design and Electrodeposition Modalities II, 228th Electrochemical Society Meeting, Phoenix AZ, October 2015.

Co-chair, Symposium on Surfactant and Additive Effects on Thin Film Deposition, Dissolution and Particle Growth, 227th Electrochemical Society Meeting, Chicago IL, May 2015.

Co-chair, Symposium on Emerging Materials and Processes for Energy Conversion and Storage, 222th Electrochemical Society Meeting, Honolulu HI, October 2012.

LOCAL / GLOBAL COMMUNITY SERVICES

Advisory faculty, Electrochemical Society UA student chapter, UA, 2016 – present.

NSF panel review, CBET, SBIR, 2016.

Member, Equipment and Facility Committee, Department of Chemical and Biological Engineering, UA, 2016 – present.

Co-organizer and judge for UA Engineering – Marion high school outreach program, 2016.

Judge, AIChE SEC (regional conference), 2016.

Member, IBM Corporation Service Corp - Philippines 2015 team. One of the global volunteering teams working with the National Economic Development Authority of Republic of the Philippines on social and economic development issues.

Judge, Student Poster Competition, 226th Electrochemical Society Meeting, Cancun, Mexico, October 2014.

Judge, Westchester Science and Engineering Fair (WSEF), 2014 and 2015. WSEF is a fair where a selected group of high school students showcased their multi-year research science projects in a competitive venue toward the Intel International Science & Engineering Fair.

Mentor, PTECH, 2012 – present. PTECH is a special high school located in Brooklyn, NY, offering a program from 9th to 14th grade, which allows the students to earn an associate degree.