

# Jaime C. Grunlan

Department of Mechanical Engineering, Texas A&M University, College Station, TX 77843-3123  
(979) 845-3027 phone; (979) 845-3081 fax; [jgrunlan@tamu.edu](mailto:jgrunlan@tamu.edu)

## EDUCATION:

June 2001 UNIVERSITY OF MINNESOTA Minneapolis, MN  
PhD in Materials Science and Engineering w/ Chemistry minor

May 1997 NORTH DAKOTA STATE UNIVERSITY Fargo, ND  
B.S. in Chemistry w/ Polymers & Coatings Option

## PROFESSIONAL POSITIONS:

September 2014 to present TEXAS A&M UNIVERSITY, College Station, TX  
*Professor*  
Studying polymer nanocomposites for energy, electronic, packaging, purification, optical and flame retardant applications. Teaching undergraduate and graduate courses in materials science and polymers.

- Appointments in Mechanical Engineering, Chemistry and Materials Science & Engineering.

September 2010 to August 2014 TEXAS A&M UNIVERSITY, College Station, TX  
*Associate Professor and Gulf Oil/Thomas Dietz Development Professor I*

- Appointments in Mechanical Engineering, Chemistry and Materials Science & Engineering.
- Research highlighted in *Nature*, *C&EN*, *Smithsonian Magazine*, *New York Times* and in various local newspapers and newscasts.

September 2012 to November 2015 UNIVERSITY OF EXETER, Exeter, UK  
*Honorary Visiting Professor*  
Studying the properties of composites made using cellulose nanowhiskers in collaboration with faculty in the College of Engineering, Maths and Physical Sciences at the University of Exeter.

July 2004 to August 2010 TEXAS A&M UNIVERSITY, College Station, TX  
*Assistant Professor*

- Guest edited special issues of *Review of Scientific Instruments*.
- Won NSF CAREER, 3M and Dow Young Faculty awards.

June 2001 to July 2004 AVERY RESEARCH CENTER, Pasadena, CA  
*Senior Research Engineer (Research Engineer until late 2002)*  
Research and development of polymer-based electronic and biological materials for new business development.

August 2002 to December 2003 AZUSA PACIFIC UNIVERSITY, Azusa, CA  
*Adjunct Professor*  
Taught Physical Science for non-science majors and Introduction to Materials Science for pre-engineering majors.

January 2002 to May 2002 BIOLA UNIVERSITY, La Mirada, CA  
*Adjunct Professor*  
Taught Introduction to Materials Science for pre-engineering students. Created new curriculum that will continue to be taught every other year.

## **CURRENT GRADUATE STUDENTS:**

1. Morgan Plummer (PhD **2018**) – *Antiflammable Nanocoatings*
2. Taylor Smith (PhD **2018**) – *Thin Films for Gas Barrier*
3. Merid Haile (PhD **2017**) – *Antiflammable Nanocoatings*
4. Tyler Guin (PhD **2016**) – *Antiflammable Nanocoatings*
5. Kevin Holder (PhD **2016**) – *Antiflammable Nanocoatings*
6. Fangming Xiang (PhD **2015**) – *Thin Films for Gas Barrier*
7. David Hagen (PhD **2015**) – *Thin Films for Gas Barrier*
8. Ping Tzeng (PhD **2015**) – *Thin Films for Gas Separation/Purification*
9. Bart Stevens (PhD **2015**) – *Thermoelectric Polymer Nanocomposites*
10. Amanda Cain (PhD **2014**) – *Antiflammable Behavior of Nanostructured Thin Films Using Layer-by-Layer Assembly*

## **GRADUATED STUDENTS:**

### *PhD (Major Subject Graduation Year)*

1. Gregory Moriarty (Materials Science and Engineering **2013**) – *Tailoring the Thermoelectric Behavior of Electrically Conductive Polymer Composites* [postdoc at University of Minnesota – Twin Cities]
2. Galina Laufer (Mechanical Engineering **2012**) – *Layer-by-Layer Nanocoatings with Flame Retardant and Oxygen Barrier Properties: Moving Toward Renewable Systems* [Senior Engineer at PepsiCo Advanced Research]
3. You-Hao Yang (Chemical Engineering **2012**) – *Processing and Gas Barrier Behavior of Multilayer Thin Nanocomposite Films* [postdoc at NIST]
4. Morgan Priolo (Materials Science and Engineering **2012**) – *Gas Permeability of Nanostructured Thin Films Using Layer-by-Layer Assembly* [Senior Research Engineer at 3M]
5. Yu-Chin Li (Materials Science and Engineering **2011**) – *Environmentally Benign Flame Retardant Nanocoatings for Fabric* [guest researcher at NIST]
6. Yong Tae Park (Mechanical Engineering **2011**) – *Transparent and Conductive Carbon Nanotube Multilayer Thin Films Suitable as an Indium Tin Oxide Replacement* [Assistant Professor of Mechanical Engineering at Myongji University, Seoul, South Korea]
7. Krishna Chaitanya Etika (Materials Science and Engineering **2010**) – *Stimuli-Tailored Dispersion State of Aqueous Carbon Nanotube Suspensions and Solid Polymer Nanocomposites* [Senior DETD Process Engineer at Intel]

8. Andrea Adamczak (Materials Science and Engineering **2010**) – *High Temperature Materials for Aerospace Applications* [Senior Multi-Disciplined Engineer at Raytheon]
9. Lei Liu (Materials Science and Engineering **2009**) – *Structure Property Relationships in Carbon Nanotube-Polymer Systems: Influence of Non-Covalent Stabilization Techniques* [Polymer Scientist at E Ink Corporation]
10. Woo-Sik Jang (Mechanical Engineering **2008**) – *Layer-by-Layer Assembly of Clay-Filled Polymer Nanocomposite Thin Films* [postdoc at Yale University]
11. Yeon Seok Kim (Mechanical Engineering **2007**) – *Electrically Conductive Polymer Nanocomposites with Segregated Network Microstructures* [guest researcher at NIST]

**M.S. (Major Subject Graduation Year)**

1. Zachary Levin (Mechanical Engineering **2011**) – *Polymer Nanocomposite Strain Sensors* [pursuing PhD in Mechanical Engineering at Texas A&M]
2. Charlene Dvoracek (Mechanical Engineering **2009**) – *Antimicrobial Activity of Cationic Antiseptics in Layer-by-Layer Thin Film Assemblies* [pursuing PhD in Materials Science at Johns Hopkins]
3. Thomas Dawidczyk (Mechanical Engineering **2008**) – *Layer-by-Layer Assembly of Poly(3,4-ethylenedioxy-thiophene) Thin Films: Tailoring Growth and UV-Protection* [postdoc at UIUC]
4. Sethu Madhukar (Mechanical Engineering **2007**) – *Electrical and Mechanical Behavior of Segregated Networks of Carbon Black and Clay* [Deep Sea Engineering]
5. C. Jason Jan (Mechanical Engineering **2006**) – *Thin Film Carbon Black Composites with Tunable Transparency and Electrical Conductivity* [Business Development Analyst at Air Liquide USA LLP]

**AWARDS:**

E. D. Brockett Professorship (2013)  
 2012 L.E. Scriven Young Investigator Award (sponsored by ISCST)  
 Gulf Oil/Thomas A. Dietz Development Professor I (2011 – 2014)  
 2010 Carl Dahlquist Award  
 Dow 2009 Young Faculty Award (2009)  
 NSF CAREER (2007 – 2012)  
 3M Untenured Faculty Grant (2007 – 2010)  
 Texas Engineering Experiment Station Select Young Faculty (2007)  
 Charles & Dorothy Byrd Award for Outstanding Thesis Research (2001)  
 Doctoral Dissertation Fellowship (2000 – 01)  
 Kodak Fellow (1997 – 2000)  
 NDSU Varsity Football – Full Scholarship (1992 – 94)

**SOCIETY**

**MEMBERSHIPS:**

American Chemical Society [ACS] (1996 – present)  
 Materials Research Society [MRS] (1998 – present)  
 American Society for Engineering Education [ASEE] (2005 – present)  
 American Society of Mechanical Engineers [ASME] (2006 – present)  
 American Institute of Chemical Engineers [AIChE] (2011 – present)

## **EXTERNAL PROFESSIONAL ACTIVITIES:**

*Materials Research Society (MRS)*: Lead Organizer for MRS Symposium R – Transport Behavior in Heterogeneous Polymeric Materials and Composites (Spring 2007); Lead Organizer for MRS Symposium KK – Transport Properties in Polymer Nanocomposites (Fall 2008); Lead Organizer for MRS Symposium DD – Transport Properties in Polymer Nanocomposites II (Fall 2011)

*National Science Foundation (NSF)*: CMMI NanoManufacturing Panels (2006; 2008); Site Visitor for Center for Hierarchical Manufacturing (CHM) at UMass – Amherst (2012)

*Polymeric Materials: Science and Engineering (PMSE) Division of the American Chemical Society (ACS)*: PMSE Fellows Program Administrator (2008 – 2012); Lead Organizer for Frontiers in Polymer Science and Engineering: A Symposium Celebrating the PMSE Fellows Program (March 2012)

## **JOURNAL EDITORIAL ACTIVITIES:**

Editor, *Journal of Materials Science* **2014 – present**

Editorial Board, *Nanocomposites* **2014 – present**

Associate Editor, *Green Materials* **2011 – present**

Member, Editorial Board, *Journal of Nanotechnology* **2009 – 2011**

Member, Editorial Board, *Research Letters in Nanotechnology* **2007 – 2009**

## **RESEARCH FUNDING:**

1. *Development of Stretchable Gas Barrier Nanocoating*. Inflatables Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 7/1/2014 – 6/30/2015. Dollar Value: \$107,861.
2. *Development of Gas/Moisture Barrier Nanocoating for Flexible Packaging*. Consumer Products Company (Confidential), **J. C. Grunlan** (PI). Dates: 7/1/2014 – 12/31/2014. Dollar Value: \$67,000.
3. *Multifunctional Nanocoatings for Nylon-Based Carpet*. Carpet Maker (Confidential), **J. C. Grunlan** (PI). Dates: 4/1/2014 – 3/31/2015. Dollar Value: \$87,571.
4. *Layer-by-Layer Coatings on Nylon/Cotton Fabrics*. University of Dayton Research Institute, **J. C. Grunlan** (PI). Dates: 3/1/2014 – 2/28/2015. Dollar Value: \$59,000. [This is a sub-contract from a larger Army Natick project.](#)
5. *Gas Barrier Nanocoatings for Inflatable Aircraft*. Aircraft Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 3/1/2014 – 8/31/2014. Dollar Value: \$52,547.
6. *Flame Retardant Nanocoatings for Aircraft Substrates*. Aircraft Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 2/1/2014 – 11/20/2014. Dollar Value: \$115,993.
7. *Multifunctional Nanocoatings for Sporting Goods*. Sporting Goods Maker (Confidential), **J. C. Grunlan** (PI). Dates: 1/1/2014 – 12/31/2014. Dollar Value: \$100,000.

8. *Flame Retardant Nanocoatings for Nylon-Based Fabric*. Fiber Maker (Confidential), **J. C. Grunlan** (PI). Dates: 11/15/2013 – 11/14/2014. Dollar Value: \$125,080.
9. *Flame Retardant Nanocoatings for High Performance Fibers and Fabric*. Fabric Maker (Confidential), **J. C. Grunlan** (PI). Dates: 11/1/2013 – 10/31/2014. Dollar Value: \$98,146.
10. *Development of Gas Barrier Layer for Bottles and Rigid Packaging*. Drink Maker (Confidential), **J. C. Grunlan** (PI). Dates: 9/1/2013 – 8/31/2014. Dollar Value: \$125,080.
11. *Flame Retardant Nanocoatings for Aircraft Interior Substrates*. Interiors Maker (Confidential), **J. C. Grunlan** (PI). Dates: 5/1/2013 – 10/31/2014. Dollar Value: \$166,255.
12. *Development of Low Cost, High Gas Barrier Layer for Window Seal*. Window Maker (Confidential), **J. C. Grunlan** (PI). Dates: 5/1/2013 – 7/31/2013. Dollar Value: \$27,695.
13. *Flame Retardant Nanocoatings for Aircraft Substrates*. Aircraft Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 4/1/2013 – 12/21/2013. Dollar Value: \$98,947.
14. *Multilayer Nanocoatings for Flame Retardant Cable*. Cable Maker (Confidential), **J. C. Grunlan** (PI). Dates: 4/1/2013 – 3/31/2014. Dollar Value: \$100,000.
15. *Thermoelectric Cooling and Waste Heat Recovery Using Polymer Nanocomposites*. U.S. Air Force Office of Scientific Research, **J. C. Grunlan** (co-PI). Dates: 03/15/2013 – 03/14/2017. Dollar Value: \$1,132,779.
16. *Structure-Property Relationships in Natural Composites*. Natural Composites, Inc., **J. C. Grunlan** (PI). Dates: 1/1/2013 – 12/31/2013. Dollar Value: \$48,857.
17. *Flame Retardant Nanocoatings for Building Materials*. Building Materials Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 1/1/2013 – 12/31/2014. Dollar Value: \$261,256.
18. *Development of Intumescent Multilayer Nanocoatings for Foam and Fabric Using Completely Renewable Molecules*. Chemtura Corporation, **J. C. Grunlan** (PI). Dates: 9/1/2012 – 8/31/2014. Dollar Value: \$212,313.
19. *Protection of Sporting Goods*. Sporting Goods Maker (Confidential), **J. C. Grunlan** (PI). Dates: 8/1/2012 – 1/31/2013. Dollar Value: \$51,068.
20. *Evaluation of Flame Retardant Nanotechnology on Aircraft Substrates*. Aircraft Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 8/1/2012 – 12/21/2012. Dollar Value: \$83,129.
21. *Evaluation of Flame Retardant Nanotechnology in Bedding*. Bedding Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 3/1/2012 – 2/28/2013. Dollar Value: \$102,039.
22. *High Barrier Polymer Development*. The Dow Chemical Company. **J. C. Grunlan** (PI). Dates: 10/1/2011 – 9/30/2013. Dollar Value: \$364,788.
23. *Flame Retardant and Damage-Resistant Nanocoatings for Fabric, Fibers and Fill from Environmentally Benign Materials*. USDOC – National Institute of Standards & Technology, **J. C. Grunlan** (PI). Dates: 9/1/2011 – 8/31/2014. Dollar Value: \$461,309.

24. *Thermoelectric Polymer Composites*. Company (Confidential), **J. C. Grunlan** (PI). Dates: 9/1/2011 – 8/31/2013. Dollar Value: \$201,935.
25. *Development of Fully Organic Thermoelectric Materials for Converting Waste Heat to Useful Energy*. II-VI Foundation, **J. C. Grunlan** (PI). Dates: 7/1/2011 – 6/30/2013. Dollar Value: \$191,250.
26. *Improvement of Tires*. Tire Maker (Confidential), **J. C. Grunlan** (PI). Dates: 5/1/2011 – 4/30/2015. Dollar Value: \$410,165.
27. *Transparent Nanocoatings for Gas and Moisture Barrier on Polymer Film*. Kuraray America, Inc., **J. C. Grunlan** (PI). Dates: 3/1/2011 – 2/28/2013. Dollar Value: \$203,324.
28. *Performance Evaluation of Flame Resistant Coating for Foam*. Huntsman International LLC. **J. C. Grunlan** (PI). Dates: 12/15/2010 – 12/14/2011. Dollar Value: \$89,754.
29. *Pursuing Moisture Barrier in Self-Assembled Thin Films*. Kuraray America, Inc., **J. C. Grunlan** (PI). Dates: 6/21/2010. Dollar Value: \$15,000. [This is an unrestricted gift from Kuraray.](#)
30. *REU Site: Multifunctional Materials Systems*. National Science Foundation, **J. C. Grunlan** (co-PI). Dates: 06/04/10 – 06/03/12. Dollar Value: \$345,000.
31. *Evaluation of Flame Retardant Nanotechnology in Bedding*. Bedding Manufacturer (Confidential), **J. C. Grunlan** (PI). Dates: 6/1/2010 – 5/31/2011. Dollar Value: \$98,753.
32. *Performance Evaluation of Flame Resistant Coating for Foam*. Huntsman International LLC. **J. C. Grunlan** (PI). Dates: 12/1/2009 – 5/31/2010. Dollar Value: \$37,804.
33. *Energy Harvesting: Thermoelectric Waste Heat Recovery Using Polymer Nanocomposites*. U.S. Air Force Office of Scientific Research, **J. C. Grunlan** (co-PI). Dates: 09/01/2009 – 08/31/2013. Dollar Value: \$662,897.
34. *Nanocomposite Coatings*. Bayer Corporation. **J. C. Grunlan** (PI). Dates: 1/1/2009 – 12/31/2010. Dollar Value: \$176,690.
35. *Protective Coatings*. Baker Hughes. **J. C. Grunlan** (PI). Dates: 1/1/2009 – 12/31/2010. Dollar Value: \$180,772.
36. *Improvement of Sporting Goods*. Sporting Goods Maker (Confidential), **J. C. Grunlan** (PI). Dates: 1/1/2009 – 6/30/2011. Dollar Value: \$235,417.
37. *Improvement of Thin Film Oxygen Barrier from Layer-by-Layer Assembly*. Appleton, **J. C. Grunlan** (PI). Dates: 9/1/2008 – 8/31/2009. Dollar Value: \$115,589. [This is a sub-contract from a multi-million dollar Army Natick project focused on MRE packaging.](#)
38. *Layer-by-Layer Assembly of Flame Retardant Coatings for Foam and Fabric*. USDOC – National Institute of Standards & Technology, **J. C. Grunlan** (PI). Dates: 7/1/2008 – 6/30/2011. Dollar Value: \$253,165.
39. *Layer-by-Layer Assembly of Fast Switching, High Contrast Electrochromics*. The Dow Chemical Company. **J. C. Grunlan** (PI). Dates: 6/1/2008 – 5/31/2010. Dollar Value: \$162,897.

40. *Evaluation of Epoxy Nanocomposites Containing Carbon Nanosphere Chains*. Clean Technologies International Corp. **J. C. Grunlan** (PI). Dates: 9/1/2007 – 2/29/2008. Dollar Value: \$38,572.
41. *New Accelerated Aging Test and Methodology for Ballistic Fibers and Fabrics*. Army Research Office, **J. C. Grunlan** (co-PI). Dates: 7/09/2007 – 08/30/2008. Dollar Value: \$500,000.
42. *Transparent, Electrically Conductive Nanocomposite Thin Films*. 3M Corporation, **J. C. Grunlan** (PI). Dates: 6/13/2007 – 06/12/2010. Dollar Value: \$45,000. [This is award money in conjunction with the 3M Untenured Faculty Grant.](#)
43. *Performance Characterization of Polyimide-Carbon Fiber Composites for Future Hypersonic Vehicles*. U.S. Air Force Office of Scientific Research, **J. C. Grunlan** (co-PI). Dates: 04/01/2007 – 03/31/2010. Dollar Value: \$443,504.
44. *CAREER: Tailoring Nanoparticle Microstructure Using Stimuli-Responsive Polymers*. National Science Foundation, **J. C. Grunlan** (PI). Dates: 03/01/07 – 02/28/12. Dollar Value: \$400,000.
45. *Surface Modification Using Multifunctional Composite Thin Films*. Army Research Laboratory, **J. C. Grunlan** (PI). Dates: 9/1/2006 – 8/31/2007. Dollar Value: \$73,283.
46. *Functionalized Polyolefin Films Using Layer-by-Layer Assembly*. The Dow Chemical Company. **J. C. Grunlan** (PI). Dates: 2/1/2006 – 1/30/2008. Dollar Value: \$149,254.

## PUBLICATIONS:

### REFEREED JOURNAL PUBLICATIONS

1. A. A. Cain,<sup>b</sup> M. Plummer,<sup>b</sup> S. Murray,<sup>c</sup> L. Bolling,<sup>c</sup> O. Regev, **J. C. Grunlan,**<sup>a</sup> “Single bilayer nanocoating of polycation and high aspect ratio clay nanoplatelets imparts substantial thermal/flame protection for polyurethane foam,” *submitted*.
2. D. Patra,<sup>d</sup> P. Vangal,<sup>c</sup> A.A. Cain,<sup>b</sup> C. Cho,<sup>d</sup> O. Regev, **J. C. Grunlan,**<sup>a</sup> “Inorganic nanoparticle multilayer thin film that suppresses flammability of polyurethane with only a single electrostatically-assembled bilayer,” *submitted*.
3. B. Teipel,<sup>b</sup> **J. C. Grunlan,**<sup>a</sup> “Synergy in epoxy nanocomposites with cellulose nanocrystals and boehmite,” *submitted*.
4. B. Stevens,<sup>b</sup> M. Priolo,<sup>d</sup> P. Odenborg,<sup>c</sup> **J. C. Grunlan,**<sup>a</sup> “Hydrophobically-modified polyelectrolyte for improved oxygen barrier in nanobrick wall multilayer thin films,” *Journal of Polymer Science Part B: Polymer Physics* **2014**, in press.
5. T. Guin,<sup>b</sup> M. Kreckler,<sup>c</sup> A. Milhorn,<sup>c</sup> **J. C. Grunlan,**<sup>a</sup> “Maintaining hand and improving fire resistance of cotton fabric through ultrasonication rinsing of multilayer nanocoating,” *Cellulose* **2014**, in press.
6. A. A. Cain,<sup>b</sup> S. Murray,<sup>c</sup> K. Holder,<sup>b</sup> C. R. Nolen,<sup>c</sup> **J. C. Grunlan,**<sup>a</sup> “Intumescent nanocoating extinguishes flame on fabric using aqueous polyelectrolyte complex deposited in single step,” *Macromolecular Materials and Engineering* **2014**, in press.

7. B. Stevens,<sup>b</sup> E. Dessiatova,<sup>c</sup> D. Hagen,<sup>b</sup> T. Alexander, C. Bielawski, **J. C. Grunlan**,<sup>a</sup> “Low temperature thermal reduction of graphene oxide nanobrick walls: Unique combination of high gas barrier and low resistivity in fully organic polyelectrolyte multilayer thin films,” *ACS Applied Materials and Interfaces* **2014**, *6*, 9942.
8. T. Guin,<sup>b</sup> M. Krecker,<sup>c</sup> D. Hagen,<sup>b</sup> **J. C. Grunlan**,<sup>a</sup> “Thick growing multilayer nanobrick wall thin films: Super gas barrier with very few layers,” *Langmuir* **2014**, *30*, 7057.
9. D. Hagen,<sup>b</sup> B. Foster,<sup>c</sup> B. Stevens,<sup>b</sup> **J. C. Grunlan**,<sup>a</sup> “Shift-time polyelectrolyte multilayer assembly: Fast film growth and high gas barrier with fewer layers by adjusting deposition time,” *ACS Macro Letters* **2014**, *3*, 663.
10. K. M. Holder,<sup>b</sup> B. R. Spears, M. E. Huff,<sup>c</sup> M. A. Priolo,<sup>d</sup> E. Harth, **J. C. Grunlan**,<sup>a</sup> “Stretchable gas barrier achieved with partially hydrogen-bonded multilayer,” *Macromolecular Rapid Communications* **2014**, *35*, 925 ([front cover article](#)).
11. D. Hagen,<sup>b</sup> C. Box,<sup>c</sup> S. Greenlee,<sup>c</sup> F. Xiang,<sup>b</sup> O. Regev, **J. C. Grunlan**,<sup>a</sup> “High gas barrier imparted by similarly charged multilayers in nanobrick wall thin films,” *RSC Advances* **2014**, *4*, 18354.
12. A. J. Mateos,<sup>c</sup> A. A. Cain,<sup>b</sup> **J. C. Grunlan**,<sup>a</sup> “Large-scale continuous immersion system for layer-by-layer deposition of flame retardant and conductive nanocoatings on fabric,” *Industrial & Engineering Chemistry Research* **2014**, *53*, 6409.
13. F. Xiang,<sup>b</sup> P. Tzeng,<sup>b</sup> J. Sawyer,<sup>c</sup> **J. C. Grunlan**,<sup>a</sup> “Improving gas barrier of clay-polymer multilayer thin films using shorter deposition times,” *ACS Applied Materials and Interfaces* **2014**, *6*, 6040.
14. S. C. Chang, R. Slopek, **J. C. Grunlan**, B. Condon, “Surface coating for flame retardant behavior of cotton fabric using a continuous layer-by-layer process,” *Industrial & Engineering Chemistry Research* **2014**, *53*, 3805.
15. D. Kim, P. Tzeng,<sup>b</sup> K. J. Barnett, Y. Yang,<sup>b</sup> B. A. Wilhite, **J. C. Grunlan**,<sup>a</sup> “Highly size-selective ionically crosslinked multilayer polymer films for light gas separation,” *Advanced Materials* **2014**, *26*, 746.
16. P. Tzeng,<sup>b</sup> C. R. Maupin,<sup>c</sup> **J. C. Grunlan**,<sup>a</sup> “Influence of polymer interdiffusion and clay concentration on gas barrier of polyelectrolyte/clay nanobrick wall quadlayer assemblies,” *Journal of Membrane Science* **2014**, *452*, 46.
17. A. A. Cain,<sup>b</sup> C. R. Nolen,<sup>c</sup> Y.-C. Li, R. Davis, **J. C. Grunlan**,<sup>a</sup> “Phosphorus-filled nanobrick wall multilayer thin film eliminates polyurethane melt dripping and reduces heat release associated with fire,” *Polymer Degradation and Stability* **2013**, *98*, 2645.
18. M. A. Priolo,<sup>b</sup> K. M. Holder,<sup>c</sup> S. M. Greenlee,<sup>c</sup> **J. C. Grunlan**,<sup>a</sup> “Precisely tuning the clay spacing in nanobrick wall gas barrier thin films,” *Chemistry of Materials* **2013**, *25*, 1649.
19. G. Laufer,<sup>b</sup> C. Kirkland,<sup>c</sup> A. B. Morgan, **J. C. Grunlan**,<sup>a</sup> “Exceptionally flame retardant sulfur-based multilayer nanocoating for polyurethane prepared from aqueous polyelectrolyte solutions,” *ACS Macro Letters* **2013**, *2*, 361. [This paper was featured in the News of the Week section of C&EN \(6 MAY 2013\) and was featured in ScienceNews \(1 JUN 2013\).](#)



20. G. P. Moriarty,<sup>b</sup> K. Briggs,<sup>c</sup> B. Stevens,<sup>b</sup> C. Yu, **J. C. Grunlan**,<sup>a</sup> “Dual stabilizer approach to high thermoelectric power factor nanocomposites: Fully organic materials for waste heat recovery,” *Energy Technology* **2013**, *1*, 265.
21. G. Laufer,<sup>b</sup> C. Kirkland,<sup>c</sup> A. A. Cain,<sup>b</sup> **J. C. Grunlan**,<sup>a</sup> “Oxygen barrier of multilayer thin films comprised of polysaccharides and clay,” *Carbohydrate Polymers* **2013**, *95*, 299.
22. G. Laufer,<sup>b</sup> M. A. Priolo,<sup>b</sup> C. Kirkland,<sup>c</sup> **J. C. Grunlan**,<sup>a</sup> “High oxygen barrier, clay and chitosan-based multilayer thin films: An environmentally-friendly foil replacement,” *Green Materials* **2013**, *1*, 4.
23. Y. H. Yang,<sup>b</sup> L. Bolling,<sup>c</sup> M. A. Priolo,<sup>b</sup> **J. C. Grunlan**,<sup>a</sup> “Super gas barrier and selectivity of graphene oxide-polymer multilayer thin films,” *Advanced Materials* **2013**, *25*, 503 ([front cover article](#)).
24. Z. Levin,<sup>b</sup> C. Robert,<sup>b</sup> J. F. Feller, M. Castro, **J. C. Grunlan**,<sup>a</sup> “Flexible latex – polyaniline segregated network composite coating capable of measuring large strain on epoxy,” *Smart Materials and Structures* **2013**, *22*, 015008.
25. G. P. Moriarty,<sup>b</sup> S. De, P. J. King, M. Via, J. A. King, J. N. Coleman, **J. C. Grunlan**,<sup>a</sup> “Thermoelectric behavior of organic thin film nanocomposites,” *Journal of Polymer Science Part B: Polymer Physics* **2012**, *51*, 119.
26. Y. H. Yang,<sup>b</sup> L. Bolling,<sup>c</sup> M. Haile,<sup>c</sup> **J. C. Grunlan**,<sup>a</sup> “Influence of crosslinking on oxygen and moisture barrier of polyelectrolyte multilayer thin films,” *RSC Advances* **2012**, *2*, 12355.
27. M. A. Priolo,<sup>b</sup> K. M. Holder,<sup>c</sup> S. M. Greenlee,<sup>c</sup> **J. C. Grunlan**,<sup>a</sup> “Transparency, gas barrier and moisture resistance of large aspect ratio vermiculite nanobrick wall thin films,” *ACS Applied Materials and Interfaces* **2012**, *4*, 5529.
28. K. M. Holder,<sup>c</sup> M. A. Priolo,<sup>b</sup> K. E. Secrist, S. M. Greenlee,<sup>c</sup> A. J. Nolte, **J. C. Grunlan**,<sup>a</sup> “Humidity-responsive gas barrier of hydrogen-bonded polymer-clay multilayer thin films,” *Journal of Physical Chemistry C* **2012**, *116*, 19851.
29. G. Laufer,<sup>b</sup> C. Kirkland,<sup>c</sup> A. Morgan, **J. C. Grunlan**,<sup>a</sup> “Intumescent multilayer nanocoating, made with renewable polyelectrolytes, for flame retardant cotton,” *Biomacromolecules* **2012**, *13*, 2843.
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<sup>a</sup> Corresponding author. <sup>b</sup> Graduate student advised. <sup>c</sup> Undergraduate mentored. <sup>d</sup> Postdoc advised.

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<sup>a</sup> Corresponding author.    <sup>b</sup> Graduate student advised.    <sup>c</sup> Undergraduate student mentored.  
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## **PATENTS:**

**J. C. Grunlan** “Multilayer coating for flame retardant foam or fabric,” U.S. Patent XXXX (filed July 26, 2012).

**J. C. Grunlan** “Multilayer coating for flame retardant foam or fabric,” U.S. Patent 20100227070 A1 (filed September 9, 2010).

**J. C. Grunlan**, C. Yu, “Thermoelectric polymer composites,” U.S. Provisional Filing [TAMUS-2814] (filed October 21, 2008).

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J. P. Coleman, I. J. Forster, S. W. Ferguson, **J. C. Grunlan**, A. W. Holman, P. Liu, “Transistor device and method of making,” U. S. Patent 20040200061 A1 (filed April 11, 2003).

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**J. C. Grunlan**, Y.-H. Chiao, K. Li, M. Licon, R. Heydarpour, “Low permeability materials and coatings,” U.S. Patent 6,764,885.

## **SIGNIFICANT PRESENTATIONS:**

### **2014**

“The evolution of environmentally-benign flame retardant nanocoatings deposited using layer-by-layer assembly,” by **J. C. Grunlan**, presented at Layer-by-Layer (LbL) Assemblies: Science and Technology Conference, Hoboken, NJ on June 25, 2014 (*Invited Presentation*).

“Low temperature thermal reduction of graphene oxide nanobrick walls: Unique combination of high gas barrier/separation and low resistivity in fully organic polyelectrolyte multilayer thin films,” by **J. C. Grunlan**, presented to the Smart Plastics Group – LIMATB, University of South Brittany, Lorient, France on June 17, 2014 (*Invited Seminar*).

“Multilayer polymer nanocomposite thin films capable of separating gases and stopping fire,” by **J. C. Grunlan**, presented to the School of Materials, The University of Manchester, Manchester, UK on June 13, 2014 (*Invited Seminar*).

“Water-based, flame retardant nanocoatings for foam, textiles and other polymeric substrates: New environmentally-benign opportunities,” by **J. C. Grunlan**, presented at the 25<sup>th</sup> Annual Conference on Recent Advances in Flame Retardancy of Polymeric Materials in Stamford, CT on May 19, 2014 (*Invited Presentation*).

“Antiflammable nanocoatings using renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at Fire Retardants in Plastics 2014 in Denver, CO on May 14, 2014 (*Invited Presentation*).

“Antiflammable nanocoatings for textiles using renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at Techtextil North America 2014 in Atlanta, GA on May 13, 2014 (*Invited Presentation*).

“Anti-flammable nanocoatings for textiles using renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at Converting and Bonding Conference (CAB 2014), in Greenville, SC on May 8, 2014 (*Invited Presentation*).

“Multilayer polymer nanocomposite thin films capable of separating gases and stopping fire,” by **J. C. Grunlan**, presented at DuPont in Willmington, DE on May 1, 2014 (*Invited Presentation*). This seminar was part of DuPont’s “Frontiers of Materials Science” series.

“Polyelectrolyte multilayer nanocomposites for flame suppression, gas separation and so much more...,” by **J. C. Grunlan**, presented at the 247<sup>th</sup> American Chemical Society National Meeting in Dallas, TX on March 18, 2014 (*Invited Presentation*).

“The promise of fully organic polymer nanocomposite thermoelectrics: Turning wasted heat into useful electricity,” by **J. C. Grunlan**, presented at the Joint Workshop on “Energy Polymers” in Potsdam, Germany on January 23, 2014 (*Invited Presentation*).

### 2013

“Nanobrick wall multilayer thin films with exceptional gas barrier and flame suppression,” by **J. C. Grunlan**, presented at the Materials Research Society (MRS) Fall Meeting 2013 in Boston, MA on December 3, 2013 (*Invited Presentation*).

“Stopping fire and reducing gas permeability with nanobrick wall multilayer thin film coatings,” by **J. C. Grunlan**, presented to the Department of Materials Science and Engineering, Purdue University, West Lafayette, IN on November 22, 2013 (*Invited Departmental Seminar*).

“Multilayer thin films from renewable and/or environmentally-benign polyelectrolytes for flame retardant protection of polymeric substrates,” by **J. C. Grunlan**, presented at the Southeast Regional Meeting of the American Chemical Society (SERMACS) 2013 in Atlanta, GA on November 13, 2013 (*Invited Presentation*).

“Stopping fire and controlling gas flow with nanobrick wall composite thin films,” by **J. C. Grunlan**, presented at Composites at Lake Louise 2013 in Alberta, Canada on November 7, 2013 (*Plenary Talk*).

“Environmentally benign nanocoatings that create a flame-retardant gas blanket for aircraft, interior foams, fabrics, etc.,” by **J. C. Grunlan**, presented at the High Performance Composites for Aircraft Interiors, part of Composites World (CW) 2013, in Seattle, WA on October 2, 2013 (*Invited Presentation*).

“Nanobrick walls for gas barrier and flame suppression and polymer nanocomposites for thermoelectric energy conversion,” by **J. C. Grunlan**, presented to the Department of Mechanical Engineering, University of Arkansas, Fayetteville, AR on September 27, 2013 (*Invited Departmental Seminar*).

“Polymer-platelet nanobrick wall thin films for gas barrier and separation,” by **J. C. Grunlan**, presented at KTH Royal Institute of Technology in Stockholm, Sweden on August 21, 2013 (*Invited Presentation*).

“Water-based flame retardant nanocoatings comprised of renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at KTH Royal Institute of Technology in Stockholm, Sweden on August 20, 2013 (*Invited Departmental Seminar*).

“Nanobrick wall thin films: Gas barrier and flame retardancy of polyelectrolyte nanoplatelet multilayer coatings,” by **J. C. Grunlan**, presented at Particles 2013: Particles in Composites and Related Advanced Materials in Dayton, OH on August 6, 2013 (*Invited Presentation*).

“Nanobrick walls for gas barrier and flame suppression: Clay-polymer nanocomposite thin films,” by **J. C. Grunlan**, presented at Polymer Composites and High Performance Materials in Santa Rosa, CA on July 23, 2013 (*Invited Presentation*).

“Antiflammable nanocoatings for textiles made with renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at the 14<sup>th</sup> European meeting on Fire Retardancy and Protection of Materials in Lille, France on July 2, 2013 (*Invited Keynote Lecture*).

“Water-based, flame retardant nanocoatings comprised of renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at the 24<sup>th</sup> Annual Conference on Recent Advances in Flame Retardancy of Polymeric Materials in Stamford, CT on May 20, 2013 (*Invited Presentation*).

“Polyelectrolyte-clay nanobrick walls thin films for flame suppression, gas barrier and so much more...,” by **J. C. Grunlan**, presented to the Department of Chemical and Biomolecular Engineering, University of Houston, Houston, TX on April 26, 2013 (*Invited Departmental Seminar*).

“Influence of processing parameters on the gas barrier and antiflammable behavior of polymer-clay nanobrick walls,” by **J. C. Grunlan**, presented at ANTEC 2013 in Cincinnati, OH on April 22, 2013 (*Invited Presentation*).

“Polymer-clay brick wall thin films as transparent foil replacement for food packaging,” by **J. C. Grunlan**, presented at the 245<sup>th</sup> American Chemical Society National Meeting in New Orleans, LA on April 9, 2013 (*Invited Presentation*).

“Layer-by-layer assembly of clay-based nanobrick walls for gas barrier/separation and flame suppression,” by **J. C. Grunlan**, presented at the 245<sup>th</sup> American Chemical Society National Meeting in New Orleans, LA on April 7, 2013 (*Invited Presentation*).

“Polyelectrolyte-silicate nanobrick wall thin films for flame suppression, gas barrier and so much more...,” by **J. C. Grunlan**, presented at the International Research Center for Materials NanoArchitectonics (MANA), National Institute for Materials Science (NIMS), in Tsukuba, Japan on March 13, 2013 (*Invited Seminar*).

“The promise of fully organic nanocomposite thermoelectric materials: Turning wasted heat into useful voltage,” by **J. C. Grunlan**, presented at the 2<sup>nd</sup> International Workshop on Green Innovation, Tokyo University of Science Yamaguchi, in Yamaguchi, Japan on March 11, 2013 (*Invited Seminar*).

“Nanobrick wall multilayer coatings for gas barrier and fire suppression,” by **J. C. Grunlan**, presented at Smart Coatings 2013, in Orlando, FL on February 20, 2013 (*Invited Seminar*).

“Polyelectrolyte-silicate nanobrick walls thin films for flame suppression, gas barrier and so much more...,” by **J. C. Grunlan**, presented to the Department of Chemistry and Biochemistry, Angelo State University, San Angelo, TX on February 11, 2013 (*Invited Presentation*).

## 2012

“Layer-by-layer assembly of aluminosilicate-polyelectrolyte nanobrick walls for gas barrier and flame suppression,” by **J. C. Grunlan**, presented at Silicon-Containing Polymers and Composites, in San Diego, CA on December 10, 2012 (*Invited Presentation*).

“Nanobrick walls that stop fire and polymer nanocomposites capable of using body heat to power your mobile phone,” by **J. C. Grunlan**, presented at Zing Polymer Chemistry Conference 2012, in Cancun, Mexico on November 13, 2012 (*Invited Presentation*).

“Antiflammable nanocoatings for foam and fabric using renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at Research, Innovation & Science for Engineered Fabrics (RISE 2012), in Baltimore, MD on October 24, 2012 (*Invited Presentation*).

“Fire-resistant nanocoatings for foam and fabric using renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at the High Performance Composites for Aircraft Interiors, part of Composites World (CW) 2012, in Seattle, WA on September 26, 2012 (*Invited Presentation*).

“Nanobrick walls for gas barrier and flame suppression and polymer nanocomposites for thermoelectric energy conversion,” by **J. C. Grunlan**, presented to the Department of Mechanical Engineering, Southern Methodist University, Dallas, TX on September 14, 2012 (*Invited Departmental Seminar*).

“Thermoelectric polymer nanocomposites,” by **J. C. Grunlan**, presented at the 244<sup>th</sup> American Chemical Society National Meeting in Philadelphia, PA on August 20, 2012 (*Invited Presentation*).

“Nanobrick walls for gas barrier and flame suppression and polymer nanocomposites for thermoelectric energy conversion,” by **J. C. Grunlan**, presented to the Smart Plastics Group, University of South Brittany, in Lorient, France on July 10, 2012 (*Invited Presentation*).

“Nanobrick walls for gas barrier and flame suppression and polymer nanocomposites for thermoelectric energy conversion,” by **J. C. Grunlan**, Tech Talk presented at the NASA Johnson Space Center, in Houston, TX on July 2, 2012 (*Invited Presentation*).

“Thermoelectric polymer nanocomposites,” by **J. C. Grunlan**, presented at the IUPAC World Polymer Congress 2012 in Blacksburg, VA on June 26, 2012 (*Invited Presentation*).

“Water-based, flame retardant nanocoatings for foam and fabric,” by **J. C. Grunlan**, presented at the Fire Retardants in Plastics 2012 in Denver, CO on June 14, 2012 (*Invited Presentation*).

“Layer-by-layer assembly of antiflammable nanocoatings for foam and fabric using renewable and/or environmentally-benign materials,” by **J. C. Grunlan**, presented at the 23<sup>rd</sup> Annual Conference on Recent Advances in Flame Retardancy of Polymeric Materials in Stamford, CT on May 21, 2012 (*Invited Presentation*).

“Nanobrick walls that stop fire and nanocomposites that could use your body heat to power your mobile phone,” by **J. C. Grunlan**, presented to the College of Engineering, Mathematics and

Physical Sciences, University of Exeter, England on May 16, 2012 (*Invited Presentation – part of Exeter’s “Inspiring Science” series of presentations designed to get the general public excited about science and engineering*).

“Nanobrick walls for protecting clothing from fire and polymer nanocomposites that can use body heat to power a cell phone,” by **J. C. Grunlan**, presented to the School of Engineering and Materials Science, Queen Mary University of London, England on May 14, 2012 (*Invited Departmental Seminar*).

“Thick and thin film polymer-CNT nanocomposites for thermoelectric energy conversion and transparent electrodes,” by **J. C. Grunlan**, presented to the Department of Mechanical Engineering, Texas Tech University, Lubbock, TX on May 7, 2012 (*Invited Departmental Seminar*).

“Layer-by-layer assembly of multifunctional nanocoatings,” by **J. C. Grunlan**, presented to the Industrial Technology Research Institute (ITRI), in Hsinchu, Taiwan on April 27, 2012 (*Invited Presentation*).

“Nanobrick walls that stop fire and nanocomposites that could power cell phones using body heat,” by **J. C. Grunlan**, presented to the Department of Mechanical Engineering, National University of Singapore on April 20, 2012 (*Invited Departmental Seminar*).

“Tailoring Gas Permeability and Imparting Flame Retardant Behavior Using Nano Brick Wall Thin Film Assemblies,” by **J. C. Grunlan**, presented at the Materials Research Society Spring Meeting 2012 in San Francisco, CA on April 11, 2012 (*Invited Presentation*).

“Layer-by-layer assembly of water-based, environmentally-friendly flame retardant nanocoatings for fabric and foam,” by **J. C. Grunlan**, presented at the 243<sup>rd</sup> American Chemical Society National Meeting in San Diego, CA on March 26, 2012 (*Invited Presentation*).

“Layer-by-layer assembly of transparent thin films on polymeric substrates for gas barrier, fire resistance and transparent electrodes,” by **J. C. Grunlan**, presented at BASF in Wyandotte, MI on March 20, 2012 (*Invited Presentation*). This seminar was sponsored by BASF’s Committee for Scientific Innovation and Interaction (CSI<sup>2</sup>).

“Thick and thin film polymer – carbon nanotube composites for thermoelectric energy conversion and transparent electrodes,” by **J. C. Grunlan**, presented at the TMS 2012 141<sup>st</sup> Annual Meeting & Exhibition in Orlando, FL on March 14, 2012 (*Invited Presentation*).

“Layer-by-layer assembly of transparent thin films on polymeric substrates for gas barrier, fire resistance and transparent electrodes,” by **J. C. Grunlan**, presented at LeTourneau University in Longview, TX on February 9, 2012 (*Invited Departmental Seminar*).

“Layer-by-layer assembly of transparent thin films on polymeric substrates for gas barrier, fire resistance and transparent electrodes,” by **J. C. Grunlan**, presented at the Southwest Research Institute in San Antonio, TX on January 24, 2012 (*Invited Departmental Seminar*).

## **2011**

“Layer-by-layer assembly of transparent thin films on polymeric substrates for gas barrier, fire resistance and transparent electrodes,” by **J. C. Grunlan**, presented to the Department of Chemical and Biomolecular Engineering, University of Notre Dame, South Bend, IN on December 6, 2011 (*Invited Presentation*).

“Thermoelectric behavior of electrically conductive polymer composites,” by **J. C. Grunlan**, presented at the 67<sup>th</sup> Southwest Regional Meeting of the American Chemical Society in Austin, TX on November 10, 2011 (*Invited Presentation*).

“Layer-by-layer assembly of polymer and nanoplatelets to create gas barrier and flame retardant thin films,” by **J. C. Grunlan**, presented at the 67<sup>th</sup> Southwest Regional Meeting of the American Chemical Society in Austin, TX on November 9, 2011 (*Invited Presentation*).

“Polymer-clay nano brick walls for gas barrier and flame suppression,” by **J. C. Grunlan**, presented at Composites at Lake Louise 2011 in Alberta, Canada on November 1, 2011 (*Invited Presentation*).

“Thick and thin film water-based coatings containing carbon nanotubes: Thermoelectric energy conversion and transparent electrodes from fully organic materials,” by **J. C. Grunlan**, presented at the 242<sup>nd</sup> American Chemical Society National Meeting in Denver, CO on August 28, 2011 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional nanocoatings,” by **J. C. Grunlan**, presented to the Department of Chemical Engineering, University of South Carolina, Columbia, SC on July 29, 2011 (*Invited Presentation*).

“Thermoelectric behavior of electrically conductive polymer nanocomposites,” by **J. C. Grunlan**, presented at International Conference on Materials for Advanced Technologies (ICMAT) 2011, in Singapore on June 27, 2011 (*Invited Presentation*).

“High electrical conductivity and thermoelectric performance in segregated network polymer nanocomposites,” by **J. C. Grunlan**, presented at Summer Forum on Materials and Nanotechnology, North Dakota State University, in Fargo, ND on June 9, 2011 (*Invited Plenary Lecture*).

“Polymer-clay nano brick walls for transparent gas barrier on plastic film,” by J. C. Grunlan, presented at the Pressure Sensitive Tape Council (PSTC) Week of Learning, Orlando, FL on May 12, 2011 (*Invited Presentation*). [This is where I received the plaque associated with winning the 2010 Carl A. Dahlquist Award, for best presentation, the previous year.](#)

“Layer-by-layer assembly of polymer and clay: Gas barrier and flame retardant thin films,” by **J. C. Grunlan**, presented at the 241<sup>st</sup> American Chemical Society National Meeting in Anaheim, CA on March 30, 2011 (*Invited Presentation*).

“Novel anti-flammable nanocoatings for textiles,” by **J. C. Grunlan**, presented at the American Association of Textile Colorists and Chemists (AATCC) International Conference 2011 in Charleston, SC on March 23, 2011 (*Invited Presentation*).

“Gas barrier and anti-flammability of polymer-clay nano brick walls,” by **J. C. Grunlan**, presented at the International LbL Symposium 2011 in Strasbourg, France on March 12, 2011 (*Invited Presentation*).

“High electrical conductivity and thermoelectric performance in segregated network polymer nanocomposites,” by **J. C. Grunlan**, presented at SPE Polymer Nanocomposites 2011, Lehigh University, in Bethlehem, PA on March 9, 2011 (*Invited Keynote Lecture*).

“Layer-by-layer assembly of transparent thin films on polymeric substrates for gas barrier, fire resistance and electrical conductivity,” by **J. C. Grunlan**, presented at the 3M Corporation’s Tech Forum in St. Paul, MN on March 3, 2011 (*Invited Presentation*).

“Thick and thin film polymer-CNT nanocomposites for thermoelectric energy conversion and transparent electrodes,” by **J. C. Grunlan**, presented to the Department of Mechanical Engineering, University of Houston, Houston, TX on January 27, 2011 (*Invited Presentation*).

## 2010

“Tailoring nanocomposite properties using stimuli-responsive polymers,” by **J. C. Grunlan** and K. C. Etika, presented at the Materials Research Society Fall Meeting 2010 in Boston, MA on November 29, 2010 (*Invited Presentation*).

“Transparent nanocomposite oxygen barrier coating for polymer films,” by **J. C. Grunlan**, presented at the European Coatings Conference on Packaging Coatings, in Berlin, Germany on October 13, 2010 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional thin films for gas barrier, fire resistance and other types of environmental protection,” by **J. C. Grunlan**, presented to the Department of Chemistry, University of Texas – Pan American, Edinburg, TX on October 7, 2010 (*Invited Presentation*).

“Thick and thin film polymer-CNT nanocomposites for thermoelectric energy conversion and transparent electrodes,” by **J. C. Grunlan**, presented to the Department of Mechanical Engineering and Nanotechnology Graduate Program, Stevens Institute of Technology, Hoboken, NJ on September 29, 2010 (*Invited Presentation*).

“Anti-flammable thin film assemblies on cotton fabric,” by **J. C. Grunlan**, presented at the Southern Textile Research Conference 2010 in Myrtle Beach, SC on September 20, 2010 (*Invited Presentation*).

“Thermoelectric polymer nanocomposites,” by **J. C. Grunlan**, presented at the 240<sup>th</sup> American Chemical Society National Meeting in Boston, MA on August 22, 2010 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional nanocomposites,” by **J. C. Grunlan**, presented to Politecnico di Torino, Alessandria, Italy on July 6, 2010 (*Invited Presentation*).

“Layer-by-Layer Assembly of Nanocomposite Thin Films,” by **J. C. Grunlan**, presented to the Max Planck Institute for Polymer Research, Mainz, Germany on June 7, 2010 (*Invited Presentation*).

“Clay-polymer thin films for imparting flame retardant behavior to foam and textiles,” by **J. C. Grunlan**, presented at the European Coatings Conference on Fire Retardant Coatings IV, in Berlin, Germany on June 3, 2010 (*Invited Presentation*).

“Nanocomposite gas barrier thin films on PET,” by **J. C. Grunlan**, presented at the Pressure Sensitive Tape Council Week of Learning, in Las Vegas, NV on May 13, 2010 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional thin films for flame suppression, gas barrier, and other types of environmental protection,” by **J. C. Grunlan**, presented to the Department of Fiber Science & Apparel Design, Cornell University, Ithaca, NY on March 12, 2010 (*Invited Presentation*).

“Stimuli-responsive dispersion of carbon nanotubes in water and highly conductive segregated network composites for energy harvesting,” by **J. C. Grunlan**, presented at the Gordon Research Conference on Composites in Ventura, CA on January 19, 2010 (*Invited Presentation*).

## 2009

“Layer-by-layer assembly of multifunctional thin films,” by **J. C. Grunlan**, presented at Kimberly-Clark Corporation in Roswell, GA on November 6, 2009 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional thin films,” by **J. C. Grunlan**, presented to the Department of Chemistry and Biochemistry, Texas State University, San Marcos, TX on November 2, 2009 (*Invited Presentation*).

“Flame resistance via 3-D composite coatings,” by **J. C. Grunlan**, presented at International Nonwovens Technical Conference 2009, Denver, CO on September 23, 2009 (*Invited Presentation*).

“Multifunctional polymer nanocomposites for energy conversion, gas barrier and anti-flammability,” by **J. C. Grunlan**, presented at The Dow Chemical Company (formerly Rohm and Haas) in Spring House, PA on July 23, 2009 (*Acceptance of Dow 2009 Young Faculty Award*).

“Anti-flammable and foil replacement technologies based upon clay-containing thin films: Efforts to obtain sponsorship and/or partnerships for commercial development,” presented at the 46<sup>th</sup> Annual Meeting of The Clay Minerals Society, in Billings, MT on June 8, 2009 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional thin films,” by **J. C. Grunlan**, presented at NSTI Nanotech 2009 in Houston, TX on May 6, 2009 (*Keynote Presentation*).

“Tailoring carbon nanotube microstructure through noncovalent interactions,” by **J. C. Grunlan**, presented at the 237<sup>th</sup> American Chemical Society National Meeting in Salt Lake City, UT on March 23, 2009 (*Invited Presentation*).

“Layer-by-layer assembly of flame retardant coating for foam and fabric,” by **J. C. Grunlan**, presented at the NIST Barrier Fabric Workshop in Gaithersburg, MD on March 19, 2009 (*Invited Presentation*).

## 2008

“Layer-by-layer assembly of multifunctional thin films,” by **J. C. Grunlan**, presented to the Department of Chemistry, Marquette University, in Milwaukee, WI on September 26, 2008 (*Invited Presentation*).

“Layer-by-layer assembly of multifunctional thin films,” by **J. C. Grunlan**, presented to the Department of Chemistry, University of Texas at Dallas, in Richardson, TX on September 19, 2008 (*Invited Presentation*).

“Multifunctionality of clay-based thin films prepared via layer-by-layer assembly,” by **J. C. Grunlan**, presented at the 235<sup>th</sup> American Chemical Society National Meeting in New Orleans, LA on April 8, 2008 (*Invited Presentation*).

“Layer-by-layer assembly of nano brick walls: Tailoring film growth and oxygen barrier,” by **J. C. Grunlan**, presented at SPE Polymer Nanocomposites 2008, Lehigh University, in Bethlehem, PA on March 4, 2008 (*Invited Keynote Lecture*).

“Layer-by-layer assembly of multifunctional nanocomposite coatings,” by **J. C. Grunlan**, presented at Smart Coatings 2008, in Orlando, FL on February 27, 2008 (*Invited Seminar*).



## 2007

“Multifunctional polymer nanocomposites,” by **J. C. Grunlan**, presented to the Department of Polymer Science and Engineering, Univ. Mass. Amherst, in Amherst, MA on September 14, 2007 (*Invited Presentation*).

“Layer-by-layer assembly of thin multifunctional coatings,” by **J. C. Grunlan**, presented at the 234<sup>th</sup> American Chemical Society National Meeting in Boston, MA on August 20, 2007 (*Invited Presentation*). This was the Tess Award Symposium in honor of L. E. “Skip” Scriven.

Grunlan, J. C., “Carbon-filled polymer nanocomposites,” Centro de Investigacion en Quimica Aplicada (CIQA), in Saltillo, Mexico on August 10, 2007 (*Invited Presentation*).

“Electrical and mechanical behavior of epoxy containing carbon nanotubes and clay,” by **J. C. Grunlan**, presented at the ASME Applied Mechanics and Materials Conference in Austin, TX on June 7, 2007.

“Layer-by-layer assembly of thin nanocomposite oxygen barrier,” by **J. C. Grunlan** and W. S. Jang, presented at the Materials Research Society Spring Meeting 2007 in San Francisco, CA on April 11, 2007.

“Layer-by-layer assembly of multifunctional thin films,” by **J. C. Grunlan**, presented at SPE Polymer Nanocomposites 2007, Lehigh University, in Bethlehem, PA on March 7, 2007 (*Invited Presentation*).

## 2006

“Deposition and patterning of conductive carbon black thin films,” by **J. C. Grunlan**, M. Walton, Y. Kim, W. N. Everett, C. J. Jan, and W. S. Jang, presented at the Materials Research Society Spring Meeting 2006 in San Francisco, CA on April 10, 2007.

“Tailoring dispersion and microstructure of carbon nanotubes using weak polyelectrolytes,” by **J. C. Grunlan**, presented at the Materials Research Society Fall Meeting 2006 in Boston, MA on November 27, 2006.

“Tailoring the behavior of conductive polymer nanocomposites using non-covalent interactions,” by **J. C. Grunlan**, presented as the Grain Processing Corporation Distinguished Lecturer for the Department of Chemical Engineering, Michigan Tech. Univ., in Houghton, MI on October 27, 2006 (*Invited Presentation*).

“Layer-by-layer assembly of nanocomposite oxygen barrier,” by **J. C. Grunlan**, presented at the 232<sup>nd</sup> American Chemical Society National Meeting in San Francisco, CA on September 13, 2006.

“Thin film assemblies of carbon black with tunable transparency and electrical conductivity,” by **J. C. Grunlan**, J. Jan, M. Walton, E. McConnell, and W. S. Jang, presented at the Materials Research Society Spring Meeting 2006 in San Francisco, CA on April 20, 2006.

“Reversible control of carbon nanotube microstructure using poly(acrylic acid),” by **J. C. Grunlan**, L. Liu, and Y. S. Kim, presented at the Materials Research Society Spring Meeting 2006 in San Francisco, CA on April 19, 2006.

“Multifunctional nanocomposite thin films,” by **J. C. Grunlan**, presented to the School of Polymers & High Performance Materials, University of Southern Mississippi, in Hattiesburg, MS on February 8, 2006 (*Invited Presentation*).

## **2005**

“High-throughput preparation and screening of polymeric coatings,” by **J. C. Grunlan**, presented at the 2005 Materials Research Society Fall Meeting in Boston, MA on November 29, 2005 (*Invited Presentation*).

“Functional multilayer thin films prepared using layer-by-layer assembly,” by **J. C. Grunlan**, presented at the 229<sup>th</sup> American Chemical Society National Meeting, in San Diego, CA on March 17, 2005 (*Invited Presentation*).