

Namiko Yamamoto

Assistant Professor of Aerospace Engineering
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RESEARCH INTERESTS:

Experimental studies of nano-/micro-engineered materials aimed for high-performance aerospace applications: multi-scale structure-interphase-property relationship study, scalable nano-manufacturing, micro-structure/composite design to deliver unique properties, polymer nano-composites, and porous ceramics.

PROFESSIONAL PREPARATION:

- B.S., Aeronautics and Astronautics, Massachusetts Institute of Technology, July 2004
- M.S., Aeronautics and Astronautics, Massachusetts Institute of Technology, Sept 2006
- Ph.D., Aeronautics and Astronautics, Massachusetts Institute of Technology, Feb 2011
- Postdoctoral Associate, Aeronautics and Astronautics, Massachusetts Institute of Technology, Feb 2011- May 2011
- Postdoctoral Fellow, California Institute of Technology/NASA Jet Propulsion Laboratory, Jun 2011- Jun 2014

APPOINTMENTS:

- Assistant Professor in Aerospace Engineering, the Pennsylvania State University, Jul 2014- Present

GRANTS and AWARDS:

- Office of Naval Research, "Multi-functional Nano-porous Ceramics," \$447,663 (PI, Jun 2017 – May 2020). Collaboration with Dr. Jogender Singh (Co-PI, PSU MatSci, ARL).
- Equal Opportunity Planning Committee, Penn State University, "Climate Improvement for Aerospace Engineering women by professional development," \$3000 (PI, Aug 2017 – May 2018). Collaboration with Dr. Susan Stewart (Co-PI, PSU AERSP).
- Office of Naval Research, DURIP, "Scalable manufacturing of hierarchical 3D polymer nanocomposites using oscillating magnetic fields," \$82,574 (PI, Jan 2017 – Dec 2017).
- Department of the Army, "Penn State Vertical Lift Research Center of Excellence: Seamless Manufacturing of Hybrid-Material Turbines for High Temperature Rotorcraft Propulsion System by Field Assisted Sintering," \$743,874 (PI, Aug 2016 – Jul 2021). Collaboration with Dr. Jogender Singh (Co-PI, PSU MatSci, ARL).
- Office of Naval Research, "1D-patterned Nanocomposites Structured Using Oscillating Magnetic Fields," \$376,599 (Single PI, Feb 2016 - Jan 2019).
- NASA Jet Propulsion Laboratory, the Center for Academic Partnerships (CAP), "CAP with Penn State University to Accelerate Scaling and Certification of Novel Materials for Space Applications," \$24,700 (Jan 2016 - Sept 2016)
- The Penn State University, Hartz Family Career Development Professorship in Engineering, \$14,000 per year for three years (Jul 2014 – Jun 2017)
- Keck Institute for Space Studies Postdoctoral Fellowship, Caltech (2011-2014)

THESIS ADVISEES:

Current: Yagmur Atescan (PhD), Jingyao Dai (PhD), Charis Lin (MS), Mychal P. Spencer (PhD)

Graduated: Jatin Haibat (MS, Aug 2016), Jingyao Dai (MS, Aug 2017), Steven Ceneviva (BS, Honor thesis, May 2017, the Wolk Senior Thesis Award)

REFEREED JOURNAL PUBLICATIONS:

1. M.P. Spencer, D. Gao, and **N. Yamamoto**, "Structuring of Nanoparticles Using Oscillating Magnetic Fields," manuscript in preparation, May 2017.
2. J. Haibat, S. Ceneviva, M.P. Spencer, F. Kwok, S. Mohney, and **N. Yamamoto**, "Magnetic Assembly of Ni-coated CNTs to form 1D-ordered CNT-polymer Nanocomposites," manuscript in preparation, May 2017.

3. **N. Yamamoto**, H. Manohara, and E. Platzman, "Magnetically Anisotropic Additive for Scalable Manufacturing of Polymer Nanocomposite: Iron-coated Carbon Nanotubes," *Materials Research Express*, Vol. 3, No.2, 2016, 025004.
4. **N. Yamamoto**, E. Gdoutos, R. Toda, V. White, H. Manohara, and C. Daraio, "A Thin Film Metamaterial Consisting of Metallic Lattices: Tunable CTE for Thermal Stability," *Advanced Materials*, 2014. Cited in Editor's Choice, *Science*, Vol. 343, No. 6176, 14 March 2014.
5. R. R. Mitchell, **N. Yamamoto**, H. Cebeci, B. L. Wardle, and C. V. Thompson, "A Technique for Spatially-Resolved Contact Resistance-Free Electrical Conductivity Measurements of Aligned-Carbon Nanotube/Polymer Nanocomposites," *Composites Science and Technology*, Vol. 74, No. 24, 2013, pp. 205-210.
6. **N. Yamamoto**, R. Guzman de Villoria, and B. L. Wardle, "Electrical and Thermal Property Enhancement of Fiber-Reinforced Polymer Laminates Composites through Controlled Implementation of Multi-Walled Carbon Nanotubes," *Composites Science and Technology*, Vol. 72, No. 16, 2012, pp. 2009-2015.
7. A. M. Marconnet, **N. Yamamoto**, M. A. Panzer, B. L. Wardle, and K. E. Goodson, "Thermal Conduction in Aligned Carbon Nanotube-Polymer Nanocomposites with High Packing Density," *ACS Nano*, Vol. 5, No. 6, 2011, pp. 4818-4825.
8. R. Guzman de Villoria, **N. Yamamoto**, A. Miravete, and B. L. Wardle, "Multi-physics Damage Sensing in Nano-engineered Structural Composites," *Nanotechnology*, Vol. 22, No. 18, 2011, pp. 185502.
9. D. B. Bello, B. L. Wardle, J. Zhang, **N. Yamamoto**, C. Santeufemio, M. Hallock, and A. Virji, "Characterization of Exposure to Nanoscale Particles and Fibers During Solid Core Drilling of Hybrid CNT Advanced Composites," *International Journal of Occupational and Environmental Health*, Vol. 16, No.4, 2010, pp. 434-450.
10. H. M. Duong, **N. Yamamoto**, K. Bui, D. V. Papavassiliou, S. Maruyama, and B. L. Wardle. "Morphology Effects on Nonisotropic Thermal Conduction of Aligned Single-Walled and Multi-Walled Carbon Nanotubes in Polymer Nanocomposites," *Journal of Physical Chemistry C*, Vol. 114, No. 9, 2010, pp. 8851-8860.
11. **N. Yamamoto**, D. J. Quinn, N. Wicks, J. L. Hertz, J. Cui, H. L. Tuller, and B. L. Wardle, "Non-linear Thermomechanical Design of Microfabricated Thin Plate Devices in the Post-buckling Regime," *Journal of Micromechanics and Microengineering*, Vol. 20, No. 3, 2010.
12. **N. Yamamoto**, A. J. Hart, B. L. Wardle, and A. H. Slocum, and E. J. Garcia. "High-yield Atmospheric-Pressure Growth of Aligned Carbon Nanotubes on Ceramic Fibers for Multifunctional Enhancement of Structural Composites," *Carbon*, Vol. 47, 2009, pp. 551-560.
13. H. M. Duong, **N. Yamamoto**, D. V. Papavassiliou, S. Maruyama, and B. L. Wardle. "Inter Carbon Nanotube Contact in Thermal Transport of Controlled-Morphology Polymer Nanocomposites," *Nanotechnology*, Vol. 20, 2009, pp. 155702.
14. D. Bello, B. L. Wardle, **N. Yamamoto**, R. Guzman de Villoria, E. J. Garcia, A. J. Hart, K. Ahn, M. J. Ellenbecker, and M. Hallock, "Exposure to Nanoscale Particles and Fibers During Machining of Hybrid Advanced Composites Containing Carbon Nanotubes," *Journal of Nanoparticle Research*, Vol. 11, 2009, pp. 231-249.
15. E. J. Garcia, B. L. Wardle, A. J. Hart, **N. Yamamoto**, and A. H. Slocum. "Fabrication and Multifunctional Properties of Hybrid Laminate with Aligned Carbon Nanotubes Grown In Situ," *Composites Science and Technology*, Vol. 68, No. 9, 2008, pp. 2034-2041.
16. D. Bello, A. J. Hart, K. Ahn, M. Hallock, **N. Yamamoto**, E. J. Garcia, M. J. Ellenbecker, and B. L. Wardle. "Particle Exposure Levels during CVD Growth and Subsequent Handling of Vertically-aligned Carbon Nanotube Films," *Carbon*, Vol. 46, 2008, pp. 974-978.

CONFERENCE PRESENTATIONS:

1. **N. Yamamoto**, M. P. Spencer, D. Gao, S. Ceneviva, and S. Trivedi, "1D-Patterned Nanocomposites Structured Using Oscillating Magnetic Fields," 32nd American Society for Composites Technical Conference, Lafayette IN, Oct 2017.
2. J. Dai and **N. Yamamoto**, "The Effect of Nano Pore Size and Porosity on Deformation Behaviors of Anodic Aluminum Oxide Membranes," SAMPE Seattle 2017, Seattle WA, May 2017.
3. M. P. Spencer, D. Gao, and **N. Yamamoto**, "Experimental and Simulation Studies on Magnetic Nanoparticles Assembly for Scalable Polymer Nanocomposite Fabrication," 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, SciTech, Grapevine TX, Jan 2017.
4. J. Haibat, S. Ceneviva, F. Kwok, S. Feng, M.P. Spencer, A. L. E. Arriaga, M. Terrones, S. Mohny, and **N. Yamamoto**, "Processing of Multi-walled Carbon Nanotubes to Achieve Magnetic Additives for Polymer Nanocomposites," CARBON 2016, State College, PA, Jul. 2016.

5. M. P. Spencer, **N. Yamamoto**, "Nanoparticle Alignment using Oscillating Magnetic Fields for Scalable Nanocomposite Manufacturing," 57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, SciTech, San Diego, CA, Jan 2016.
6. **N. Yamamoto** and H. Manohara, "Magnetically Anisotropic Nano-pillars: Micro-structuring of Nanocomposites using Oscillating Magnetic Fields," 20th International Conference on Composite Materials, Copenhagen Denmark, Jul. 2015.
7. P. Bahrami, **N. Yamamoto**, Y. Chen, and H. Manohara, "Capacitance-based Damage Detection Sensing for Aerospace Structural Composites," SPIE Sensors and Smart Structures Technologies for Civil, Mechanical, and Aerospace Systems, San Diego CA, Apr. 2014.
8. **N. Yamamoto**, H. Manohara, "Magnetic Nano-Pillars: Multi-Walled Carbon Nanotubes Conformally Coated with Ferromagnetic Metals," MRS Spring Meeting & Exhibit, San Francisco CA, Apr. 2014.
9. C. Daraio, **N. Yamamoto**, E. Gdoutos, "Thermal and Mechanical Properties of Structured Thin Films with Tunable, Ultra-low Thermal Expansion," VI International Conference on Textile Composites and Inflatable Structures Structural Membranes, Munich, Germany, Oct. 2013.
10. **N. Yamamoto**, E. Gdoutos, C. Daraio, "Fabrication and Characterization of Bi-metallic Structured Films with Ultra-low Thermal Expansion," SEM Annual Conference & Exposition on Experimental and Applied Mechanics, Lombard IL, Jun. 2013.
11. **N. Yamamoto**, E. Gdoutos, C. Daraio, "Engineered Thin Films with Ultra-low Thermal Expansion Coefficient for Deformable Space Structures," 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Boston MA, Apr. 2013.
12. **N. Yamamoto**, R. Thevamaran, C. Daraio, "Dynamic Behavior of Periodic Structures Consisting of Vertically Aligned Carbon Nanotubes and Rigid Interlayer," 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu HI, Apr. 2012.
13. K. Patterson, **N. Yamamoto**, S. Pellegrino, "Thin Deformable Mirrors for a Reconfigurable Space Telescope," 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu HI, Apr. 2012.
14. **N. Yamamoto**, A. Marconnet, H.M. Duong, K.E. Goodson, and B.L. Wardle, "Non-linear Thermal Conductivity Enhancement in Nanocomposites with Aligned-CNT Implementation," 18th International Conference on Composite Materials, Jeju Island, South Korea, Aug. 2011.
15. R. Guzmán de Villoria, S.S. Kessler, **N. Yamamoto**, A. Miravete, and B.L. Wardle, "Multi-Physics Nano-engineered Structural Damage Detection and De-icing," 18th International Conference on Composite Materials, Jeju Island, South Korea, Aug. 2011.
16. R. Guzmán de Villoria, A. Miravete, **N. Yamamoto**, and B.L. Wardle, "Enhanced Thermographic Damage Detection Enabled by Multifunctional Nano-engineered Composite Laminates," 52nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Denver, CO, Apr. 2011.
17. **N. Yamamoto**, Robert Mitchell, Amy Marconnet, Carl V. Thompson, Kenneth E. Goodson, Brian L. Wardle. "Filling in the Gap: Property Scaling Effects of Aligned-CNT-Based Materials Via Controlled Nanostructure Morphology." Materials Research Society Fall Meeting, Boston MA, Dec. 2010
18. **N. Yamamoto** and B. L. Wardle. "Aligned Carbon Nanotubes Implementation in Aerospace Fiber Polymer Composites for Multi-Functional Property Enhancement." The 7th ESA Round-Table on MNT for Space Applications, Noordwijk, the Netherlands, Sept. 2010.
19. **N. Yamamoto**, R. Guzman de Villoria, H. Cebeci, and B. L. Wardle. "Thermal and Electrical Transport in Hybrid Woven Composites Reinforced with Aligned Carbon Nanotubes." 51st AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Orlando FL, Apr. 2010.
20. S. Newsome, **N. Yamamoto**, A. Grindle, B. Holschuh, M. Ono, and A. Weigel, "Analysis of US Policy Options for the Future of the International Space Station," AIAA SPACE 2009 Conference & Exposition, Pasadena CA, Sept. 2009.
21. **N. Yamamoto**, S. S. Wicks, R. Guzman de Villoria, K. Ishiguro, S. A. Steiner III, and B.L. Wardle, "Mechanical, Thermal, and Electrical Properties of Woven Laminated Advanced Composites Containing Aligned Carbon Nanotubes", 17th International Conference on Composite Materials (ICCM) , Edinburgh Scotland, Jul. 2009. *The Tsai student award, finalist.*
22. D. Bello, B. L. Wardle, **N. Yamamoto**, R. Guzman de Villoria, and M. Hallock, "Exposures to Nanoscale Particles and Fibers During Handling, Processing, and Machining of Nanocomposites and Nano-engineered Composites Reinforced with Aligned Carbon Nanotubes", 17th International Conference on Composite Materials (ICCM) , Edinburgh Scotland, Jul. 2009.

23. K. Ishiguro, R. Guzman de Villoria, S. S. Wicks, **N. Yamamoto**, and B. L. Wardle, "Processing and Characterization of Infusion-Processed Hybrid Composites with in Situ Grown Aligned Carbon Nanotubes", 50th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Palm Springs CA, May. 2009.
24. A. Marconnet, **N. Yamamoto**, M. Panzer, H. M. Duong, B. L. Wardle and K. E. Goodson. "Thermal Conductivity and Boundary Resistance of Aligned Carbon Nanotube Films and their Polymeric Composites." Materials Research Society Spring Meeting, San Francisco CA, Apr. 2009.
25. H. M. Duong, **N. Yamamoto**, M. Panzer, A. Marconnet, K E. Goodson, D. V. Papavassiliou, S. Maruyama, and B. L. Wardle, "Thermal Properties of Vertically Aligned Carbon Nanotube-Nanocomposites Boundary Resistance and Inter-Carbon Nanotube Contact: Experiments and Modeling", the American Physical Society Meeting, Pittsburgh PA, Mar. 2009.
26. **N. Yamamoto**, H. M. Duong, B. L. Wardle, D. V. Papavassiliou, and S. Maruyama. "Simulation and Experimental Correlation of Thermal Conductivity in Variable Volume Fraction Aligned Multi-walled Carbon Nanotube Composites." ASME International Mechanical Engineering Congress and Exposition, Boston MA, Oct. 2008.
27. H. M. Duong, D. V. Papavassiliou, **N. Yamamoto**, B. L. Wardle, "Off-lattice Monte Carlo Simulation of the Thermal Conductivity of Single-Walled Carbon Nanotube-Polymer Composites with Carbon Nanotube Touching Effect." ASME International Mechanical Engineering Congress and Exposition, Boston MA, Oct. 2008.
28. B. L. Wardle, D. Bello, K. Ahn, **N. Yamamoto**, R. Guzman de Villoria, M. Hallock, E. J. Garcia, and A. J. Hart, "Particles and Fiber Exposure During Machining of Hybrid Carbon-Nanotube Advanced Composites." SAMPE Fall Technical Conference, Memphis TN, Sep. 2008.
29. H. Cebeci, R. Guzman de Villoria, B. L. Wardle, D. Saito, **N. Yamamoto**, K. Ishiguro, E. J. Garcia, and A. J. Hart, "Capillarity-driven Wetting of Aligned Carbon Nanotubes in the Processing of Hybrid Advanced Composites." SAMPE Fall Technical Conference, Memphis TN, Sep. 2008.
30. S. S. Wicks, **N. Yamamoto**, R. Guzman de Villoria, K. Ishiguro, E. J. Garcia, H. Cebeci, A. J. Hart, and B. L. Wardle, "Nano-engineered Composites Reinforced with Carbon Nanotubes (CNTs)", NSTI Nanotechnology Conference and Trade Show, Boston MA, Jun. 2008.
31. **N. Yamamoto** and B. L. Wardle. "Thermal and Electrical Properties of Hybrid Woven Composites Reinforced with Aligned Carbon Nanotubes." 49th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Schaumburg, IL, Apr. 2008. *Awarded the Jefferson Goblet for the outstanding student paper.*
32. **N. Yamamoto**, E. J. Garcia, A. J. Hart, B. L. Wardle, and A. H. Slocum. "Design, Fabrication, and Characterization of Composites Reinforced with Carbon Nanotubes." Poster at MRS Fall Meeting, Boston MA, Nov. 2007.
33. **N. Yamamoto**, E. J. Garcia, A. J. Hart, B. L. Wardle, and A. H. Slocum. "Fabrication and Multifunctional Characterization of Hybrid Woven Composites Reinforced by Aligned Carbon Nanotubes." 16th International Conference on Composite Materials, Kyoto Japan, Jul. 2007.
34. **N. Yamamoto**, B. L. Wardle, N. Wicks, "Twice-buckled Cermet Composite Laminates under Equibiaxial Compression," 48th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu HI, Apr. 2007.
35. **N. Yamamoto**, N. Wicks, D. J. Quinn, J. L. Hertz, B. Wilhite, J. Cui, B. L. Wardle, K. F. Jensen, H. L. Tuller, M. A. Schmidt, "Design, Fabrication, and Testing of Multi-layered Microfabricated Solid Oxide Fuel Cells," 25th Materials Day, MIT Materials Processing Center, Cambridge MA, Oct. 2006. *Best poster award.*
36. **N. Yamamoto**, N. Wicks, B. L. Wardle, "Wrapping and Through-thickness Poisson Effects on Composite Plate and Shell Contact Laws," 46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Austin TX, Apr. 2005.

INVITED SEMINARS:

1. University of California San Diego, Department of Structural Engineering, "Nano-engineered Materials for Aerospace Applications," San Diego CA, Feb 15, 2017.
2. The Penn State University, Department of Mechanical and Nuclear Engineering, ME590 Colloquium, "Nano-engineered Materials for Aerospace Applications," State College PA, Nov 15, 2016.
3. Sikorsky, "Aerospace Applications of Nano-engineered Materials: Polymer Nanocomposites and Nanoporous Ceramics," Stratford CT, Sept 14, 2016.
4. Center for Atomically Thin Multi-functional Coatings, Industry Advisory Board Meeting, "To Enable Bulk Application of Nano-/micro-engineered Materials," State College PA, May 11, 2016

5. 3M Center, "To Enable Bulk Application of Nano-/micro-engineered Materials," St. Paul MN, March 4, 2016
6. Ouin High School, "Career in Engineering," Tokyo Japan, December 21, 2015
7. University of Tokyo, "Micro-/Nano-Engineered Materials for Aerospace Applications," Tokyo Japan, December 22, 2015
8. Boeing Rotorcraft Systems, "Nano-/Micro-Engineered Materials for Aerospace Applications," Ridley Park PA, August 12, 2015.
9. Ecole Centrale de Lyon, "Nano-/Micro-Engineered Materials for Aerospace Applications," Lyon France, July 8, 2015.
10. Swiss Federal Institute of Technology, "Nano-/Micro-Engineered Materials for Aero/Astro Applications," Zurich Switzerland, June 3, 2014.
11. NASA Langley Research Center, "Nano-/Micro-Engineered Materials and Structures for Aero/Astro Applications," Hampton VA, April 13 2013.

INVITED CONFERENCE AND WORKSHOP PRESENTATIONS:

1. The New Trends in Aerospace Lecture Series, Massachusetts Institute of Technology, Cambridge MA, March 22, 2017.
2. 69th ICAT International Smart Actuator Symposium, State College PA, "To Enable Bulk Application of Nano-/micro-engineered Materials," October 5, 2016.
3. 68th ICAT International Smart Actuator Symposium, State College PA, "Multi-functional CNT-Polymer Nanocomposites for Aerospace Applications," October 7, 2015.
4. Grad Student and Post Doc Professional Development Conference, State College PA, January 9, 2015.
5. Fourth Annual James K. Knowles Lecture and Caltech Solid Mechanics Symposium, Pasadena CA, "Light-weight Thin Bi-metallic Lattice Film, Engineered to Have Low Thermal Expansion," January 25, 2013.

PROFESSIONAL AFFILIATIONS:

- American Institute of Aeronautics and Astronautics (AIAA): Associate Member of Materials Technical Committee, Jan. 2015-Present.
- American Society for Engineering Education (ASEE): Member.

PROFESSIONAL ACTIVITIES AND SERVICE:

- **Journal Reviewer:** Journal of Microelectromechanical Systems (2008-), Composites Science and Technology (2010-), ACS Journal (2010-), International Journal of Thermal Sciences (2013-), Advanced Materials (2013-), Composites Part A (2014-), Journal of Heat Transfer (2014-), Materials Today (2014-), Journal of Composite Materials (2015-), Composites Part B (2015-).
- **Proposal Reviewer:** National Science Foundation, National Defense Science and Engineering Graduate Fellowship.
- **Session Chair:** International Conference on Composite Materials (2015), AIAA Scitech Conference (2017)
- **Education Council Member:** Massachusetts Institute of Technology (2016 -)

CAMPUS SERVICE:

- **Committees:** Department Head Search Committee (2016-2017), Safety Committee (Chair, 2016-), Graduate Studies Committee (2014- 2016), College of Engineering Global Engineering Education Faculty Planning Group (2014-2015), Wolk Senior Thesis Award Committee (2015), Faculty Search Committee (2014 - 2017)
- **PhD Thesis Committee:**
 - **Current:** Corey Breznak (ME), Ahmad Haidar, Grant Schneeberger, Kaan Yildiz
 - **Graduated:** Landen Bowen (Aug 2016, ME), Yiqiang Han (Feb 2016, AERSP), Jesse McTernan (May 2017, AERSP).
- **Faculty Adviser to Student Groups:** Phi Sigma Rho, STEM sorority (2015-), AeroDesign Club (2015-)

COURSES TAUGHT:

At the Pennsylvania State University

- AERSP301 Aerospace Structures
- AERSP470 Advanced Aerospace Structures
- AERSP496 Design, Build, and Fly
- AERSP597F Advanced Materials for Aerospace Engineering