**JESSICA O. WINTER**

**Chemical and Biomolecular Engineering | Biomedical Engineering**

**The Ohio State University |** 151 West Woodruff Avenue | Columbus, OH 43210

P: 614-247-7668 | F: 614-292-3769 | E: winter.63@osu.edu | W: <http://winternanotech.osu.edu>

**RESEARCH INTERESTS**

* Nanoparticle synthesis and modification
* Cellular Imaging and Separations
* Nanomachines
* Cell Adhesion and Migration
* Cancer Microenvironment
* Tissue Engineering and Drug Delivery

**EDUCATION**

Ph.D., Chemical Engineering,University of Texas at Austin 2004

Thesis: Development and Optimization of Quantum Dot-Neuron Interfaces

Advisors: Christine Schmidt and Brian Korgel

M.S., Chemical Engineering, University of Texas at Austin 2001

B.S. (Cum Laude), Chemical Engineering, Northwestern University 1997

**PROFESSIONAL EXPERIENCE**

Professor the Ohio State University, Columbus, OH 2015-present

Department of Chemical Engineering (75%), Department of Biomedical Engineering (25%), Biophysics Program (0%)

Associate Director Center for Emergent Materials, The Ohio State University, Columbus, OH 2013-present

Chief Science Officer Core Quantum Technologies, Columbus, OH 2012-present

Associate Professor the Ohio State University, Columbus, OH 2012-2015

Department of Chemical Engineering (75%), Department of Biomedical Engineering (25%), Biophysics Program (0%)

H.C. “Slip” Slider Associate Professor the Ohio State University, Columbus, OH 2011-2012

Department of Chemical Engineering (75%), Department of Biomedical Engineering (25%), Biophysics Program (0%)

H.C. “Slip” Slider Assistant Professor the Ohio State University, Columbus, OH 2008-2011

Department of Chemical Engineering (75%), Department of Biomedical Engineering (25%), Biophysics Program (0%)

Assistant Professor the Ohio State University, Columbus, OH 2006-2008

Department of Chemical Engineering (75%), Department of Biomedical Engineering (25%), Biophysics Program (0%)

Postdoctoral Fellow Center for Innovative Visual Research, VA Hospital, Boston, MA 2004-2006

 Advisor: Dr. Joseph Rizzo, III, Ophthalmology, Harvard Medical School

NSF Graduate Research Fellow University of Texas at Austin, Austin, TX 2001-2004

NSF IGERT Research Fellow University of Texas at Austin, Austin, TX 1999-2001

 Advisors: Christine Schmidt, Brian Korgel, Chemical Engineering

Process EngineerIntel Corporation, Albuquerque, NM 1997-1999

Engineering Intern Allied Signal Research and Development, Des Plaines, IL 1995-1997

Undergraduate Research Associate Northwestern University, Evanston, IL 1994-1996

 Advisor: Brian Hoffman, Chemistry

NSF Research Experience for Undergraduates Northwestern University, Evanston, IL 1994

 Advisor: Thomas Mason, Materials Science

**HONORS AND AWARDS**

**International/National**

Florida Association of Nanotechnology, Fellow 2020

Jacobus van t’Hoff Lecture, Delft Process Technology Institute, TU Delft 2019

American Physical Society (APS) Five Sigma Award 2018

Invited Presenter House R&D Caucus and Senate Competitiveness Committee 2017

Coalition for National Science Funding (NSF-invited Congressional presenter) 2017

Cancer Today, AACR, Cover Story 2016

AIMBE Fellow 2016

2016 Engineering Rising Star, Design News 2016

AAAS Fellow 2014

ACS, WIC, Mid-Career Rising Star Award 2014

Heaven-and-Earth Distinguished Lecture, College of Engineering, Nanjing University, China 2014

Senior Member AIChE 2013

Senior Member IEEE 2009

ACS Progress/Dreyfus Lectureship Award 2008

MRS Gold Graduate Student Award 2003

Biomedical Engineering Society Graduate Student Award 2003

NSF Graduate Research Fellowship 2001-2004

NSF IGERT Graduate Research Fellowship 1999-2001

**Regional**

40 Under 40, Columbus Business First 2015

20 People to Know in Technology, Columbus Business First 2014

Top 25 STEM Professors in Ohio, Online Schools Ohio 2013

TechColumbus Inventor of the Year 2013

Semi-finalist Columbus Tech Innovation Awards, Woman in Technology 2012-2013

**OSU**

OSU College of Engineering Innovation Award 2018

Dean’s Award for Distinguished Outreach Achievements 2017

OSU College of Engineering Diversity Award 2016

OSU College of Engineering Harrison Award 2013

Ohio Stem Ability Alliance Archer Award 2013

OSU Early Innovator Award 2012

OSU Distinguished Undergraduate Research Mentor 2011

OSU College of Engineering Lumley Research Award 2010

OSU Technology Enhanced Learning and Research Professional Development Grant 2007

**PUBLICATIONS**

**Research Articles**

 †Undergraduate Researcher, ††High School Researcher, \*Corresponding Author (if not last author)

1. L.E. Cosby, K.H. Lee, T. Knobloch, C. Weghorst, J. Winter, Comparative encapsulation efficiency of lutein in micelles synthesized via batch and high throughput methods, *In revision at* **Int J Nanomedicine**.
2. J. Gomez-Pastora, X. Wu, N.S. Rajan, J. Alawi, G. Nabar, J.O. Winter, M. Zborowski, J.J. Chalmers, Self-Assembly and sedimentation of 5 nm SPIONs using horizontal, high magnetic fields and gradients, *In press at* **Sep Purif Tech**.
3. Y. Cui, S. Cole, J. Pepper, J.J. Otero, J.O. Winter. Hyaluronic acid induces ROCK-dependent amoeboid migration in glioblastoma cells, *In press at* **Biomaterials Science**.
4. K.D. Mahajan\*, G. Ruan\*, G. Vieira, T. Porter†, J.J. Chalmers, R. Sooryakumar, J.O. Winter (2020), Biomolecular Detection, Tracking, and Manipulation using a Magnetic-Quantum Dot Platform, **J Mat Chem B**. Journal of Materials Chemistry B, 2020, 8, 3534 – 3541. [DOI: 10.1039/C9TB02481F]
5. M.A. Calhoun, Y. Cui, E. Elliott†, X. Mo, J.J. Otero, J. O. Winter, MicroRNA-mRNA Interactions at Low Levels of Compressive Solid Stress Implicate mir-548 in Increased Glioblastoma Cell Motility (2020), **Scientific Reports**, 10:311. [https://doi.org/10.1038/s41598-019-56983-x]
6. J. Johnson, A. Dehankar, J. Winter, C. Castro (2019), Reciprocal control of hierarchical DNA origami-nanoparticle composites, **Nano Letters**, 19(12): 8469-75.

[https://doi.org/10.1021/acs.nanolett.9b02786]

1. A. Dehankar, T. Porter†, J.A. Johnson, C.E. Castro, and J.O. Winter (2019), (Invited) Compact Quantum Dot Surface Modification to Enable Emergent Behaviors in Quantum Dot-DNA composites. **Journal of Chemical Physics**, 151(14): 144706.

[https://doi.org/10.1063/1.5124690]

1. J. Johnson, A. Dehankar, A. Robbins, P. Kabtiyal, E. Jergens, K.H. Lee, E. Johnston-Halperin, M. Poirier, C. Castro, J.O. Winter, The Path Towards Functional Nanoparticle-DNA Composites, (2019), **Materials Science and Engineering R- Reports**, 138: 153-209. [https://doi.org/10.1016/j.mser.2019.06.003]
2. K.H. Lee\*, T. Porter†\*, J.O. Winter. Fluorescence Loss of Commercial Aqueous Quantum Dots during Preparation for Bioimaging (2019), **MRS Communications**, 9(2): 702-709.[https://doi.org/10.1557/mrc.2019.41]
3. M.A. Calhoun, S.A. Bentil, E. Elliott†, J.J. Otero, J.O. Winter. R.B. Dupaix (2019), Beyond Linear Elastic Modulus: Viscoelastic Models for Brain and Brain Mimetic Hydrogels, **ACS Biomaterials Science and Engineering**, 5(8): 3964-3973.

[https://doi.org/10.1021/acsbiomaterials.8b01390.]

1. K.H. Lee, G. Yang†, B. Wyslouzil, J. Winter (2019), Electrohydrodynamic Mixing-Mediated Nanoprecipitation for Polymer Nanoparticle Synthesis, **ACS Applied Polymer Materials**, 1(4): 691-700. [DOI: 10.1021/acsapm.8b00206].
2. M.A. Calhoun, S.S. Chowdhury†, M.T. Nelson, J.J. Lannutti, R.B. Dupaix, and J.O. Winter (2019), Effect of Electrospun Fiber Mat Thickness and Support Method on Cell Morphology, **Nanomaterials**, 9, 644. [DOI:10.3390/nano9040644].
3. G.M. Nabar, J.O. Winter, and B.E. Wyslouzil (2018), Nanoparticle packing within block copolymer micelles prepared by the interfacial instability method, **Soft Matter**, 14, 3324-2225. [DOI: 10.1039/C8SM00425K]
4. G.M. Nabar; K.D. Mahajan, M. Calhoun, A.D. Duong, M. Souva; J. Xu, C. Czeisler, V. Puduvalli, J.J. Otero, B.E. Wyslouzil, J.O Winter (2018), Micelle-Templated, Poly(lactic-co-glycolic acid) Nanoparticles for Hydrophobic Drug Delivery, **International Journal of Nanomedicine**, 13: 351–366. [DOI: https://doi.org/10.2147/IJN.S142079]
5. K.D. Mahajan, Y. Cui, C.J. Dorcena, N. Bouxsein, G.D. Bachand, J.J. Chalmers, J.O. Winter (2018). Magnetic Quantum Dots Steer and Detach Microtubules from Kinesin-Coated Surfaces, **Biotechnology Journal,** 13, 1700402. [PMID: 28941258, DOI: 10.1002/biot.201700402]
6. M.S. Souva, G.M. Nabar, J.O. Winter, B.E. Wyslouzil (2018), Morphology of block copolymer micelles formed via electrospray enabled interfacial instability. **Journal of Colloids and Interface Science**, 512: 411-418. [DOI: 10.1016/j.jcis.2017.10.087]
7. K.D. Mahajan, G.M. Nabar, W. Xue, M. Anghelina, N. Moldovan, J. Chalmers, J. Winter (2017), Mechanotransduction Effects on Endothelial Cell Proliferation via CD31 and VEGFR2: Implications for Immunomagnetic Separation. **Biotechnology Journal**, 12(9): 1600750. [PMCID: PMC5633046]
8. A. Short, C. Czeisler, B. Stocker†, S. Cole, J. Otero, J.O. Winter (2017). Imaging Cell-Matrix Interactions in Three-Dimensional Collagen Hydrogel Culture Systems. **Macromolecular Bioscience**, 17(6): 1600478. [doi: 10.1002/mabi.201600478, PMCID: PMC5584540]
9. B. Kaya, E. Goceri, F.S. Abas, B. Elder, V. Puduvalli, J. Winter, M. Gurcan, J.J. Otero (2017). Automated fluorescent miscroscopic image analysis of PTBP1 expression in glioma, **PLoS One**, 12(3): e0170991. [doi:10.1371/journal.pone.0170991, PMCID: PMC5345755
10. C. Czeisler\*, A.R Short\*, T. Nelson, P. Gygli, C.M. Ortiz, F.P Catacutan, B. Stocker†, J. Cronin, J. Lannutti, J.O. Winter, and J.J. Otero (2016). Surface Topography During Neural Stem Cell Differentiation Regulates Cell Migration and Cell Morphology. **Journal of Comparative Neurology**, 524:3485-3502 [doi: 10.1002/cne.24078]
11. K.D. Mahajan, G. Ruan, C.J. Dorcena, G. Nabar, G. Vieira, N. Bouxsein, J.J. Chalmers, G.D. Bachand, R. Sooryakumar, J.O. Winter (2016). Steering Microtubule Shuttle Transport with Dynamically Controlled Magnetic Fields. **Nanoscale**, 8:8641-8649. [doi: 10.1039/C5NR08529B.]
12. J. Grodecki, S. Rao, A. Short, J. Otero, J. Lannutti, A. Sarkar, J. Winter (2015). Glioma-Astrocyte Interactions on White Matter Tract-Mimetic Aligned Electrospun Nanofibers, **Biotechnology Progress**, 31(5):1406-1415. [DOI: 10.1002/btpr.2123]
13. A.R. Short, A. Deshmukh†, D. Koralla†, B. Stocker†, B. Wissel†, M. Calhoun, D. Dean, J.O. Winter, Hydrogels that allow and facilitate bone repair, remodeling, and regeneration (2015). **Journal of Materials Chemistry B**, 3: 7818-7830. [DOI: 10.1039/C5TB01043H]
14. G. Nabar, J.O. Winter (2014). (Invited) Block-Copolymer Nanocomposites for Biomedical Applications, **Chemical Engineering Progress**, November 2014, 51.

 [http://www.aiche.org/resources/publications/cep/2014/november/sbe-supplement-decade-progress-block-copolymer-nanocomposites-biomedical-applications?ct]

1. M.T. Nelson, A. Short, S.L. Cole, A.C. Gross, J. Winter, T.D. Eubank, J.J. Lannutti (2014). Preferential, Enhanced Breast Cancer Cell Migration on Biomimetic Electrospun Nanofiber 'Cell Highways', **BMC Cancer**, 14: 825. [PMCID:PMC4236463]
2. S.S. Rao, J.J. Lannutti, M.S. Viapiano, A. Sarkar, J.O. Winter (2014). Toward 3D Biomimetic Models to Understand the Behavior of Glioblastoma Multiforme Cells. **Tissue Engineering Part B Reviews***.* 20(4): 314-327. [PMCID: PMC4128251]
3. A.D. Duong, G. Ruan, K. Mahajan, J.O. Winter, B.E. Wyslouzil (2014). Scalable, semi-continuous production of micelles encapsulating nanoparticles via electrospray. **Langmuir***.* 30*(*14): 3939-3948. [doi: 10.1021/la404679r, PMID:24635446]
4. J. Xu, Q. Fan, K.D. Mahajan, G. Ruan, A. Herrington, K.F. Tehrani, P. Kner, J.O. Winter (2014), Micelle-templated composite quantum dots for super-resolution imaging, **Nanotechnology**. 25(19): 195601. [doi: 10.1088/0957-4484/25/19/195601, PMID:24762566]
5. K.D. Mahajan, Q. Fan, J. Dorcéna, G. Ruan, J.O. Winter (2013). Magnetic Quantum Dots in Biotechnology- Synthesis and Applications. **Biotechnology Journal**. 8(12): 1424-1434. [doi: 10.1002/biot.201300038, PMID:24105975]
6. S.S. Rao, J. DeJesus, A.R. Short, J.J. Otero, A. Sarkar, J.O. Winter (2013). (Invited) Glioblastoma Behaviors in 3D Collagen-Hyaluronan Composite Hydrogels*.* **ACS Applied Materials and Interfaces.** 5(19): 9276-9284*.* [PMCID:PMC4333346]
7. N. Han, P. Bradley†, J. Johnson, K.S. Parikh†, A. Hissong†, M.A. Calhoun, J.J. Lannutti, J.O. Winter (2013). Effects of Hydrophobicity and Mat Thickness on Release from Hydrogel-Electrospun Fiber Mat Composites. **Journal of Biomaterials Science, Polymer Edition***.* 24(17):2018-30. [PMID:23905840]
8. S.S. Rao, T.M. Nelson, R. Xue, J.K. DeJesus, M.S. Viapiano, J.J. Lannutti, A. Sarkar, J.O. Winter (2013). Mimicking white matter tract topography using core-shell electrospun nanofibers to examine migration of malignant brain tumors. **Biomaterials**. 34(21): 5181-5190. [PMCID:PMC4080638]
9. C.J. Dorcena, K.M Olesik†, O.G Wetta†, J.O. Winter (2013). Characterization and Toxicity of Carbon Dot-Poly(lactic-co-glycolic acid) Nanocomposites for Biomedical Imaging. **Nano LIFE.** 3(1):1340002. [DOI: 10.1142/S1793984413400023]
10. G. Ruan, J.O. Winter (2012). (Invited) Chemical Engineering at the Intersection of Nanotechnology and Biology. **Chemical Engineering Progress.** December 2012, 36-40.

 [http://www.aiche.org/resources/publications/cep/2012/december/chemical-engineering-intersection-nanotechnology-and-biology]

1. K.D. Mahajan, G. Vieira, G. Ruan, B.L. Miller, M. Lustberg, J.J. Chalmers, R. Sooryakumar, J.O. Winter (2012). (Invited) A MagDot-Nanoconveyer Assay Detects and Isolates Molecular Biomarkers. **Chemical Engineering Progress.** December 2012, 41-51.
2. J. Xu, K.D. Mahajan, W. Xue, J. Winter, M. Zborowski, J. Chalmers (2012). Simultaneous, single particle, magnetization and size measurements of micron sized, magnetic particles. **Journal of Magnetism and Magnetic Materials.** 324(24): 4189-4199.
3. K.S. Parikh†, S.S. Rao, H. Ansari, L.B. Zimmerman, L.J. Lee, S.A. Akbar, J.O. Winter (2012). Ceramic Nanopatterned Surfaces to Explore the Effects of Nanotopography on Cell Attachment. **Materials Science and Engineering C.** 32: 2469–2475.
4. N. Han, J. Johnson, P. Bradley†, K.S. Parikh†, J.J. Lannutti, J.O. Winter (2012). Cell Attachment to Hydrogel-Electrospun Fiber Mat Composite Materials. **Journal of Functional Biomaterials.** 3(3):497-513.
5. S.S. Rao, S. Bentil, J. DeJesus, J. Larison†, A. Hissong†, R. Dupaix, A. Sarkar, J.O. Winter (2012). Inherent Interfacial Mechanical Gradients in 3D Hydrogels Influence Tumor Cell Behaviors. **PLoS One** 7(4):e35852. [PMC3338483]
6. N. Han, J. Johnson, J.J. Lannutti, J.O. Winter (2012). Hydrogel-Electrospun Fiber Composite Materials for Hydrophilic Protein Release. **Journal of Controlled Release.** 158(1):165-170. [PMID:22001869]
7. G. Ruan, J.O. Winter (2011). Alternating-color Quantum Dot Nanocomposites for Particle Tracking. **Nano Letters.** 11(3):941-945. [doi: 10.1021/nl103233b, PMID:21322589]
8. N. Han, S.S. Rao, J. Johnson, K.S. Parikh†, P.A. Bradley†, J.J. Lannutti, J.O. Winter (2011). Hydrogel-Electrospun Fiber Mat Composite Coatings for Neural Prostheses. **Frontiers in Neuroengineering.** 4(2):1-8. [PMCID:PMC3061411]
9. G. Ruan, D. Thakur, S. Deng, S. Hawkins†, J.O. Winter (2011). Fluorescent-magnetic nanoparticles for imaging and cell manipulation. **Journal of Nanoengineering and Nanosystems.** 223(N3/4):81-86. [Top 10 downloaded papers 2011; Top 5 cited paper in 5 years 2014] [doi: 10.1243/17403499JNN178]
10. S.S. Rao, N. Han, J.O. Winter (2011). Polylysine-modified PEG-based hydrogels to enhance the neuro-electrode interface. **Journal of Biomaterials Science, Polymer Edition.** 22: 611–625. [PMID:20566048; DOI: 10.1163/092050610X488241]
11. G. Ruan, G. Vieira, D. Thakur, T. Henighan†, A. Chen, R. Sooryakumar\*, J.O. Winter\* (2010). Simultaneous Magnetic Manipulation and Fluorescent Tracking of Single Sub-100 nm Nanoparticles. **Nano Letters.**10(6):2220–2224. [doi: 10.1021/nl1011855, PMID:20450169]
12. S. Deng, G. Ruan, N. Han, J.O. Winter (2010). Interactions in Fluorescent-Magnetic Heterodimer Nanocomposites. **Nanotechnology.** 21(14):145605. [PMID:20215661]
13. N.A. Kotov\*, J. Winter\*, I.P. Clements, E. Jan, B.P. Timko, S. Campidelli, S. Pathak, A. Mazzatenta, C.M. Lieber\*, M. Prato\*, R.V. Bellamkonda\*, G.A. Silva\*, N.W. Shi Kam, F. Patolsky, L. Ballerini. (2009). Nanomaterials for Neural Interfaces. **Advanced Materials**. 21(40): 3970-4004. [DOI: 10.1002/adma.200801984]
14. S.S. Rao, J.O. Winter (2009). Adhesion Molecule-Modified Biomaterials for Neural Tissue Engineering. **Frontiers in Neuroengineering**. 2(6):1-14. [Among the highest performing articles in this journal according to editor.]
15. D. Thakur, S. Deng, T. Baldet†, J.O. Winter (2009). pH sensitive CdS–iron oxide fluorescent–magnetic nanocomposites. **Nanotechnology***.* 20(48):485601. [Top 10% of downloaded papers 2009] [PMID:19880981]
16. J.O. Winter\*, M. Gokhale, R.J. Jensen,S.F. Cogan, J.F. Rizzo, III (2008). Tissue Engineering Applied to the Retinal Prosthesis: Neurotrophin-Eluting Polymeric Hydrogel Coatings. **Materials Science and Engineering C** 28(3): 448-453. [PMCID:PMC3065833]
17. J.O. Winter\*, S.F. Cogan, J.F. Rizzo, III (2007). Retinal Prostheses: Current Challenges and Future Outlook. **Journal of Biomaterials Science, Polymer Edition**. 18(8): 1031–1055. [Top 5 downloaded articles in 2012]

*Prior to Arrival at OSU*

1. J.O. Winter, S.F. Cogan, J.F. Rizzo, III. (2007). Neurotrophin-Eluting Hydrogel Coatings for Neural Stimulating Electrodes. **Journal of Biomedical Materials Research B**. 81B(2): 551-563.
2. N. Gomez, J.O. Winter,F. Shieh, A.E. Saunders, B.A. Korgel, C.E. Schmidt (2005). Challenges in Quantum Dot-Neuron Active Interfacing. **Talanta** 67(3):462-471.
3. J.O. Winter, S. Gatzert†, B.A. Korgel, C.E. Schmidt (2005). Variation of Cadmium Sulfide Nanoparticles Size with Altered Aqueous Synthesis Conditions. **Colloids and Surfaces A** 254(1-3): 147-157.
4. J.O. Winter, T.Y. Liu†, B.A. Korgel, C.E. Schmidt (2001). Recognition Molecule Directed Interfacing Between Semiconductor Quantum Dots and Nerve Cells. **Advanced Materials** 13:1673-1677.

**Books and Book Chapters**

1. Thomas Mensah, Ben Wang, Virginia Davis, Jessica Winter, Eds., Nanotechnology Commercialization: Manufacturing Processes and Product, Wiley, 2017.
2. G. Nabar, M. Souva, K.H. Lee, S. De, J. Lutkenhaus, B. Wyslouzil, J.O. Winter (2017). “Chapter 3: Scalable Nanomanufacturing of Nanocomposites Using Spray-Based Approaches,” Thomas Mensah, Ben Wang, Geoffrey Bothun, Jessica Winter, Virginia Davis, Eds., Nanotechnology Commercialization: Manufacturing Processes and Products, Wiley, United States, 2017.
3. S. Whitt, J.O. Winter (2013). “Glowing Nanoparticles in the Brain” in Paul W. Zitzewitz, David G. Haase, Kathleen A. Harper Eds., Physics Principles and Problems, McGraw-Hill, p. 770.
4. S. Suri, G. Ruan, J. Winter\*, C. Schmidt\* (2012). Microparticles and Nanoparticles, Buddy Ratner, Allan S. Hoffman, Frederick J. Schoen, Jack E. Lemons, Eds. Biomaterials Science, 3rd Edition, Elsevier, London, UK, p. 360-388.
5. J.O. Winter (2006). Nanostructures for Cellular Engineering, C. Kumar, Ed.,Tissue, Cell and Organ Engineering, Vol 9., Nanotechnologies  for Life Sciences, Wiley VHC, p. 388-460.

*Prior to Arrival at OSU*

1. J.O. Winter, C.E. Schmidt (2002). Biomimetic Strategies and Applications in the Nervous System. In A.K. Dillow, A.M. Lowman, Ed., Biomimetic Materials and Design, Marcel-Dekker, p. 375-415.

**Peer-Reviewed Proceedings**

1. M.L. Howdyshell, M. Prikockis, S. Lauback, G.B. Vieira, K. Mahajan, J. Winter, R. Sooryakumar (2014). Deterministic and stochastic trajectories of magnetic particles: Mapping energy landscapes for technology and biology. **IEEE Transactions on Magnetics**, 50:11, 2303507.
2. J.Q. Xu, Y. Yu, H.-C. Lee, Q. Fan, J. Winter, and G. Yang (2014). Cell penetrating peptide mediated quantum dot delivery and release in live mammalian cells, **Proc. Of the 36th Annual International Conference of IEEE Engineering in Medicine and Biology Society (EMBC2014),** 4260-4263**.** [doi: 10.1109/EMBC.2014.6944565, PMID: 25570933]
3. Q. Fan, G. Nabar, C. Miller, C. Castro, J. Winter(2014). Photo-switchable quantum dots based on reversible FRET. **Proceedings of SPIE: Nanoscale Imaging, Sensing, and Actuation for Biomedical Applications** **XI**, A.N. Cartwright; D.V. Nicolau, Eds, 8954: 89540D. [doi: 10.1117/12.2038611]
4. G. Ruan, D. Thakur, S. Hawkins†, J.O. Winter (2010). Synthesis and manipulation of multifunctional, fluorescent-magnetic nanoparticles for single molecule tracking. **Proceedings of SPIE: Colloidal Quantum Dots for Biomedical Applications V**. M. Osinski, W.J. Parak, T.M. Jovin, K. Yamamoto, Eds. 7575: 75750K1-75750K5.
5. J.O. Winter\*, N. Han, R. Jensen, S.F. Cogan, J.F. Rizzo, III (2009). Adhesion Molecules Promote Chronic Neural Interfaces Following Neurotrophin Withdrawal. **Proceedings of EMBS Annual Meeting.** 7151-7154.

*Prior to Arrival at OSU*

1. J.O. Winter, N. Gomez, B.A. Korgel, C.E. Schmidt (2005). Quantum Dots for Electrical Stimulation of Neural Cells, **Proceedings of SPIE: Nanobiophotonics and Biomedical Applications II.** Alexander N. Cartwright, Marek Osinski, Eds. 5705: 235-246.
2. J.O. Winter, C.E. Schmidt, B.A. Korgel (2004). Optimization of Quantum Dot – Nerve Cell Interfaces. **Proceedings of the 2003 Fall MRS Meeting.** *Quantum Dots: Nanoparticles, and Nanowires*. P. Guyot-Sionnest, N.J. Halas, H. Mattoussi, Z.L. Wang, U. Woggon, eds. 789: N.6.1, 2004.
3. J.O. Winter, C.E. Flynn, T.S. Liu, A.M. Belcher, B.A. Korgel, C.E. Schmidt (2002). Semiconductor – Neural Interfaces. **Proceedings of the Second Joint EMBS/BMES Conference** *and the 24th Annual Conference and the Annual Fall Meeting of the Biomedical Engineering Society*, 2:1704 -1705.

**Proceedings**

1. J.O. Winter, N. Han, M. Owens†, J. Larison†, J. Wheasler†, K. Parikh††, L. Siers (2008). Polymer hydrogel thin film coatings for acute drug delivery from neural prostheses. **PMSE Preprints**, 99:801-802.

**Other Technical Documents**

1. J. Elmer, A. Palmer, J. Winter. Bioengineering Lab Techniques: A Novel Lab Course for Protein Expression in Bacterial and Mammalian Cells in Proceedings of the ASEE 2018 Annual Conference and Exposition, Salt Lake City, UT, June 23, 2018.
2. A. Brown, S. Caine, C. Crisafulli, J. Faris, D. Lacey, R. Kayuha, A. Mazzocco, M. Norfolk, J. Schrader, J. Spitzner, K. Starkoff, J.O. Winter, B. Kern, E. Walsh, C. Williams (2014). State of the Industry: Technology Edition, Editors Clark Schaefer Hackett.

 <http://www.cshco.com/guides/state-industry-technology/>

**GRANTS**

**Current Research Funding**

1. NSF, DMR-1420451, Materials Research Science and Engineering Center, “Center for Emergent Materials,” (PI: Chris Hammel), $17.9M, 12/15/2014-12/14/2020.
2. DOE, DE-SC0017270, “Reciprocal Energy Exchange in Hierarchical DNA Origami-Nanoparticle Composites,” (PI: Jessica Winter, coPIs: Carlos Castro, Ezekiel Johnston-Halperin, Michael Poirier), $1.35M, 03/15/2020-03/14/2023.
3. CAPS Seed Grant, OSU, “In situ measurement of arbuscular mycorrhizal fungal activity in response to controlled release nutrient patches,” (PI: Allison Bennett, EEOB; coPI: Jessia Winter, Ankush Prashar, Crop Science, New Castle University), $68373, 1/1/2020-1/1/2021.
4. SUSTAIN, Seed Grant, OSU, “’Smart’ Release Fertilizer Product to Reduce Pollution and Support Sustainable Agriculture,” (PI: Alison Bennett, CoPIs: Jessica Winter, Matt Kleinhenz, Ankush Prashar (University of Newcastle, UK)), $25000, 7/1/2020-6/30/2021.

**Prior Research Funding**

1. DOE, DE-SC0017270 “Exploring Fundamental Properties of Dynamic DNA Origami-Nanoparticle Composites,” (PI: Jessica Winter, coPIs: Carlos Castro, Ezekiel Johnston-Halperin, Michael Poirier), $1.2M, 03/15/2017-03/14/2020.
2. NSF, IDBR, DBI-1555470, “Collaborative Research: IDBR Type A: QSTORM-AO-Wavefront-shaping light-sheet microscopy with photoswitchable quantum dots for superresolution imaging in thick tissue,” (PI: Peter Kner, coPIs: Jessica Winter, Carol Lynn Alpert), $728,000 ($196,440 to Winter), 06/01/2016-05/31/2019.
3. NSF, IIP, 1746540 “Magnetic Quantum Dots for Cell Separation and Characterization,” (PI: Qirui Fan, subcontractor: Jessica Winter), $225,000 ($36,059), 01/01/2018-06/30/2018.
4. OSU, IMR, IMR-FG019 “Effect of Drug Loading on Nanoparticle Morphology for Hydrophobic Drug Delivery across the Blood Brain Barrier,” (PI: Jessica Winter, coPI: Christopher Weghorst), $2,000, 01/01/2018-12/31/2018.
5. NSF, CMMI-1344567, SNM, “Continuous, Large-Scale Nanocomposite Production Via Micellular Electrospray,” (PI: Jessica Winter, coPIs: Barbara Wyslouzil, Carol Lynn Alpert (Museum of Science, Boston), Lisa Hall), $1,174,126, 09/01/2013-08/31/2017.
6. DOE, C2015A0078, Center for Integrated Nanotechnologies, “Microtubule shuttles for Nanotransport and Delivery,” (PI: Jessica Winter, co-PI: George Bachand, Sandia National Labs), 07/01/2015-12/31/2016 (Permits labor and tool use at Sandia).
7. NSF, DMR-1206745, “Micellular Electrospray Synthesis of Magnetic Quantum Dots,” (PI: Jessica Winter, coPIs: Barbara Wyslouzil (OSU), Jeffrey Chalmers (OSU), Gang Ruan (OSU)), $330,000, 07/01/2012-06/30/2016.
8. Pelotonia Cancer Research, OSU, “Defining molecular events for targeted therapy of glioblastoma using digital image analysis” (PI: Metin Gurcan, coPIs: Jessica Winter, Jose Otero, Brad Elder, Vinay Pudivalli), $100,000, 12/01/2013-11/30/2015.
9. DOE, Center for Integrated Nanotechnologies, “A Magnetic Quantum Dot-Microtubule Nanofactory,” (PI: Jessica Winter, co-PI: George Bachand, Sandia National Labs, R. Sooryakumar, OSU), 08/01/2013-12/31/2014 (Permits labor and tool use at Sandia).
10. NIST, “The structure of micelle templated PLGA nano-particles,” (PI: Barbara Wyslouzil, co-PI: Jessica Winter), 10/01/2013-09/30/2014 (Permits neutron beam time)
11. NSF, Sub-Award, OSU NSEC, EEC-0914790 “Magnetic-Fluorescent Nanoparticles for Cellular and Molecular Separations,” (PI: Jessica Winter), $69,105, 10/01/2013-09/30/2014.
12. NSF, SBIR, IIP-1315208 “Manufacturing of MultiDot Quantum Dots for Pathological Imaging,” (PI: Kristi Melnik (Core Quantum Technologies), Jessica Winter (OSU); coPIs: Gerard Lozanski (OSU, Pathology)), $150,000, 07/1/2013-06/30/2014.
13. NSF, MCB-1052623, Innovations in Biomedical Imaging and Visualization, “QSTORM: Collaborative Research: QSTORM: Switchable Quantum Dots and Adaptive Optics for Super-Resolution Imaging,” (PI: Jessica Winter, co-PIs: Peter Kner, University of Georgia, Beth Brainerd, Brown University, Ge Yang, Carnegie Mellon, Carol Lynn Alpert, Museum of Science), $1.7M ($579,527 to Winter), 09/15/2010-09/14/2013.
14. Entertainment Software Association Foundation, “Nanotech for High School Students,” (PI: Gail Wheatley, Edheads, Co-PIs: Susan Olesik, Jessica Winter, OSU), $50,000, 01/15/2011-01/15/2014.
15. OSU, IMR, “Self Patterning of Zirconia Substrate Surfaces for Biological Applications,” (PI: Sheikh Akbar, co-PI: Jessica Winter), $2,000, 01/01/2012-12/31/2013.
16. CCTS, OSU, “Induced pluripotent stem cell modeling of respiratory neuron development,” (PI: Jose Otero, coPIs: Jessica Winter, Candice Askwerth), $50,000, 08/17/2012 – 08/16/2013.
17. OSU, IMR, “Micelle-Mediated Self-assembly of Multi-functional Hybrid Nanoparticles,” (PI: Jessica Winter, co-PIs: Barbara Wyslouzil, Gang Ruan), $2,000, 01/01/2011-12/31/2012.
18. DOE, Center for Integrated Nanotechnologies, “Multifunctional Fluorescent-Magnetic Nanoparticles to Manipulate Cytoskeletal Proteins,” (PI: Jessica Winter, co-PI: George Bachand, Sandia National Labs), 12/31/2011-07/31/2013 (Permits labor and tool use at Sandia).
19. NSF, IIP, ICorp, 1242394 “Next Generation ‘MultiDot’ Quantum Dots for Biological Imaging,” (PI: Jessica Winter, coPIs: Gang Ruan (OSU), Kristie Melnik (Cytolutions)), $50,000, 07/01/2012-01/31/2013.
20. NSF, DMR-1040296, Major Research Instrumentation, “MRI: Acquisition of High Field Physical Properties Measurement System with Cryogenic AFM/MFM,” (PI: P. Chris Hammel, co-PIs: Roberto Myers, Jessica Winter, Patrick Woodward, Nitin Padture), $560,143, 09/01/10-08/31/2012.
21. NSF CBET-0854015, Biomedical Engineering, “Brain Mimetic Materials for Cancer Cell Migration Studies,” (PI: Jessica Winter), $300,000, 06/15/2009-05/31/2012.
22. NSF CMMI-0900377, Nano and Bio Mechanics, “Fluorescent-Magnetic Nanomanipulators for Cytoskeletal Mechanical Investigations,” (PI: Jessica Winter), $313,433, 06/01/2009-05/31/2012.
23. NSF, Sub-Award, OSU NSEC, “Magnetic-Fluorescent Nanoparticles for Cellular and Molecular Separations,” (PI: Jessica Winter), $69,105, 10/01/2011-09/30/2012.
24. DOE, Center for Integrated Nanotechnologies, C2011B21 “Fluorescent-Magnetic Nanocomposites: A New Tool for Manipulating the Cytoskeleton,” (PI: Jessica Winter, co-PI: George Bachand, Sandia National Labs), 07/01/2010-12/31/2011 (Permits labor and tool use at Sandia).
25. NSF, Sub-Award, OSU NSEC, “Magnetic- Fluorescent Nanoparticles for Cellular and Molecular Separations,” (PI: Jessica Winter), $44,604, 10/01/2009-09/30/2011.
26. OSU, Women in Philanthropy, “Brain Mimetic Materials,” (PI: Jessica Winter), $28,600, 07/01/2010-06/30/2011.
27. NIH 1RC2AG036559–01, “CellTrap: A novel solid phase platform for analysis of stem/progenitor  cells,” (PI: Nicanor Moldavan), $1.6M ($13,500 to Winter), 09/30/2009-09/26/2011
28. NSF, Seed Grant, OSU MRSEC, DMR-0820414 “Multifunctional Hybrid Nanomaterials: Synthesis, Manipulation and Device Arrays,” (PI: Jessica Winter), $37,500, 10/01/2009-09/30/2010
29. OSU, IMR, “Fabricating magnetic traps to manipulate nanoparticles and biological cells,” (PI: R. Sooryakumar, co-PI: Jessica Winter), $2,000, 01/01/2008-12/31/2009
30. NSF, CBET-0707969, NER, “Intracellular Nanoprobes for Physical Manipulation of Cells,” (PI: Jessica Winter, co-PI: Jeffrey Chalmers), $129,737, 06/15/2007-06/14/2008.

**PATENTS, INTELLECTUAL PROPERTY, AND COMMERCIALIZATION**

**Issued Patents**

1. J.O. Winter, K. Mahajan, G. Ruan, A. Duong, B. Wyslouzil “Methods for Producing Nanoparticles and Using Same,” EPO 2763933, filed May 27, 2014, issued March 4, 2019.
2. J.O. Winter, K. Mahajan, G. Ruan, A. Duong, B. Wyslouzil “Methods for Producing Nanoparticles and Using Same,” US Patent No. 9,550,160, filed September 27, 2012, issued January 24, 2017.

**Provisional Patents/Patent Applications**

1. J.O. Winter, K.H. Lee, B. Wyslouzil, “Liquid in liquid flash nanoprecipitation for encapsulating hydrophobic cargo in polymer nanoparticles,” Serial No. 62/768525, November 16, 2018.
2. J.O. Winter, E. Jergens, K.H. Lee, “DNA-cage erasable labels for fluorescence-based pathology,” Serial No. 62/767854, November 15, 2018.
3. J.O. Winter, H. Chandler, “Nanopatterned contact lenses to promote corneal wound healing,” filed August 29, 2014.
4. J.O. Winter, K. Mahajan, G. Ruan, “One pot separation and analysis of biomarkers by nano-conveyor belts,” US Patent Application Serial No. 13/900,924. Filed May 23, 2013.
5. J.O. Winter, K. Mahajan, G. Ruan. “Method to Use Self-assembly to Fabricate Polymeric Nanoparticles with Sub-100 nm Size, Narrow Size Distribution, Controllable Shape, and Versatile Molecular Release Kinetics, and the Resultant Nanodevice,” US Patent Application Serial No. 61/433,794, filed January 18, 2011.
6. J.O. Winter, G. Ruan. “Nanocontainers of Block Copolymer Micelles to Co-encapsulate Multiple Types of Nanospecies, and Formulations Thereof, and Methods of Use,” U.S. Patent Application Serial No. 61/483,091, filed May 6, 2011.
7. J.O. Winter, G. Ruan. “Non-Blinking and Color-Changing Nanoparticles for Single Particle Tracking,” U.S. Patent Application Serial No. 61/251,841, filed October 15, 2009; Serial No. 61/386,596, October 27, 2010; Serial No. 61/539,532, Filed October 27, 2011.
8. B. Wyslouzil, J.O. Winter, T. Doug, G. Ruan. “Semi-continuous, Large Scale Production Process of Sub-100 nm Hybrid Nanoparticles by Electrospray Coupled with Self-assembly,” U.S. Patent Application Serial No. 61/541,462, October 30, 2011.

**Invention Disclosures**

1. J.O. Winter, K.H. Lee, B. Wyslouzil, “Liquid in liquid flash nanoprecipitation for encapsulating hydrophobic cargo in polymer nanoparticles,” November 16, 2018.
2. J.O. Winter, E. Jergens, K.H. Lee, “DNA-cage erasable labels for fluorescence-based pathology,” November 15, 2018.
3. J.O. Winter, H. Chandler, “Nanopatterned contact lenses to promote corneal wound healing,” filed August 29, 2014.
4. J.O. Winter, K. Mahajan, Q. Fan. “An engineered nanofactory for reversible nanoassembly and transport,” Invention Disclosure, Filed August 22, 2013.
5. J.O. Winter, G. Ruan, Q. Fan, “Quantum Dot Light Switches: Photo-switchable quantum dots based on light-modulated fluorescence resonant energy transfer,” Invention Disclosure, Filed June 10, 2013.
6. J.O. Winter, G. Ruan. “Centrifugation-assisted Magnetic Separation of Magnetic Nanoparticles, and Methods of Use,” Invention Disclosure, Filed August 3, 2010.
7. J.O. Winter, D. Thakur. “Biocompatible fluorescent carbon nanoparticles from carbon black, and Formulations Thereof, and Methods of Use,” Invention Disclosure, Filed August 3, 2010.

**Commercialization Activities: Core Quantum Technologies**

Core Quantum Technologies (CQT) is a pre-revenue, privately held company founded in June 2012 as a Delaware C Corp by Dr. Jessica Winter, Dr. Gang Ruan, and Dr. Kunal Parikh to develop nanoparticle reagents for clinical diagnostics. CQT has licensed US Patent No. 9,550,160 from OSU (developed in Winter’s lab) and is funded by GMT Venture Partners (Atlanta). CQT currently has two products in development. *The MultiDot* is a quantum dot-based diagnostic reagent for detection of hematological cancers via flow cytometry. The MultiDot offers increased sensitivity with reduced sample processing time. The MultiDot is currently in beta testing and is expected to launch in Q4 of 2017. *The MagDot* combines all the features of the MultiDot with magnetic properties, thus generating a single reagent that can seamlessly enable magnetic separation from heterogeneous cell populations followed by flow cytometry analysis. The MagDot is in early development.

2012 1st Place, Fisher Business School Business Plan Competition, 2012, $80,000 in cash and services.

1. NSF ICorp Program, $50,000.
2. Technology Validation Start-Up Fund (Third Frontier), $100,000.
3. 2nd Place, OSU Business Builders Competition, $1000.
4. Phase I SBIR. NSF, $150,000
5. GMT Venture Partners joins the CQT Team

2017 MultiDot product launch in clinical flow cytometry market

2017 Phase I SBIR: MagDot development, $225,000

**PRESENTATIONS**

**Invited Symposia**

1. “Quantum Dots for Clinical Cancer Diagnostics: A Translation Story,” **AICHE Annual Meeting**, Orlando, FL, November 13, 2019.
2. Panel Discussion: Advice and Mentorship from Female Leaders in Innovation and Entrepreneurship, **AICHE Annual Meeting**, Orlando, FL, November 11, 2019.
3. “Electrohydrodynamic Atomization Synthesis Route for Polymer Nanoparticles Encapsulating Hydrophobic Cargoes,” in Emulsification and Encapsulation by Soft Matter Techniques, **ACS Fall Meeting**, San Diego, CA, August 25, 2019.
4. “Exploring Fundmental Properties of Dynamic DNA Origami-Nanoparticle Composites,” **DOE Biomolecular Materials PIs Meeting**, Gaithersburg, MD, August 21, 2019.
5. “Scalable Manufacturing Methods for Polymeric Nanoparticle Drug Delivery Systems,” in Nanotechnology for Biotechnology and Pharmaceuticals I, **AICHE Annual Meeting**, Pittsburgh, PA, October 31, 2018.
6. “Quantum Dot Commercialization for Clinical Applications: 20 Years Later,” in Transitioning Quantum Dots from Benchtop to Industry, **MRS Spring Meeting,** Phoenix, AZ, April 5, 2018.
7. “Nanostructured Platforms to Evaluate Cell Migration-Microenvironment Interactions in Glioma,” in Engineering in Cancer Biology, **AICHE 2017 Annual Meeting**, Minneapolis, MN, October, 30, 2017.
8. **“**Sparking Economic Growth,” **House R&D Caucus and Senate Competitiveness Caucus**, Washington, DC, October 25, 2017.
9. “Exploring Fundamental Properties of Dynamic DNA Origami –Nanoparticle Composites,” **DOE Biomolecular Materials PI Meeting**, Gaithersburg, MD, August 15-017, 2017.
10. “Micelle encapsulation: A versatile platform for generating multifunctional nanoparticles,” Inorganic Nanomaterials: Structure & Function in 0, 1 & 2 Dimensions, **253rd ACS National Meeting**, San Francisco, CA, April 4, 2017.
11. “Cellular and Molecular Biosensing Using Magnetic Quantum Dots,” Topical Plenary: Advances in Biosensing (Invited Talks), **AIChE Annual Meeting,** San Francisco, CA, November 14, 2016.
12. “High Throughput, Scalable Nanomanufacturing of Nanocomposites via Micellar Electrospray,” **11th Korea-US Forum on Nanotechnology**, Seoul, South Korea, September 28-30, 2014.
13. “Magnetic Quantum Dots for Quantitative Cell and Molecular Separations,” **Colloidal Semiconductor Nanoparticles Gordon Research Conference**, Providence, RI, July 20-25, 2014.
14. “Continuous Nanomanufacturing from Bench to Commercialization,” **Nano and Micro Manufacturing Workshop,** Dearborn, MI, May 22-23, 2013.
15. “Using Nanoparticles to Diagnose Disease” **Coalition for National Science Funding,** Washington, DC, May 7-8, 2013. (\*only 1 representative from OSU each year)
16. "Magnetic quantum dot enabled technologies for nanoscale manipulation," Formulating for Precision at the Nanometer Scale, **ACS National Meeting**, New Orleans, LA, April 7-11, 2013.
17. "Tuning mechanics and surface chemistry independently in biomaterial scaffolds to modulate cell behavior," New Frontiers and Challenges in Biomaterials Analysis, **ACS National Meeting**, New Orleans, LA, April 7-11, 2013.
18. “Fluorescent-Magnetic Nanomanipulators for Sensing and Separations” **Sandia National Laboratories** Center For Integrated Nanotechnologies User Conference, Albuquerque, NM, (September 19, 2012).
19. “Multifunctional Nanocomposites for Single Cell and Molecule Manipulation,” Bionanotechnology Plenary, **AIChE Annual Meeting**, Minneapolis, MN, October 18, 2011.
20. “Synthesis and Manipulation of Multifunctional, Fluorescent-Magnetic Nanoparticles for Single Molecule Tracking,” Colloidal Quantum Dots for Biomedical Applications V, **SPIE Photonics West**, San Jose, CA, January 23, 2010.
21. “Integrating Nanotechnology with Neural Prostheses,” Invited Speaker, Frontiers in Neuroengineering, **Monte Verita Conference**, Ascona, Switzerland, September 5-9, 2010.
22. “Fluorescent-Magnetic Nanoparticles for Imaging and Cell Manipulation,” **Nanotechnology and Nanoengineering**, Edinburgh, Scotland, April 17, 2010.
23. “Fluorescent Magnetic Nanoparticles for Cell Manipulation and Imaging,” 3rd Annual Symposium on Integrating Nanotechnology with Cell Biology and Neuroscience, **University of New Mexico**, Albuquerque, NM, August 18, 2009.
24. “Brain Mimetic Coatings to Enhance Neural Prosthesis Biocompatibility,” **Medical Materials Conference**, Clemson University, Clemson, SC, March 17-18, 2008.
25. “Nanoparticle Materials for the Neural Interface," **Gordon Research Conference**: Organic Thin Films, Centre Paul Langevin, Aussois, France, May 27 - June 1, 2007.
26. Biomimetic Microelectronics Systems Center Research Symposium: Biological Response to Central Nervous System Implants, **University of Southern California**, Los Angeles, CA, February 6, 2007.
27. "Neurotrophin-Eluting Hydrogel Coatings for Stimulating Electrical Prostheses," **Materials Science & Technology** 2006, Cincinnati, OH, Oct. 16, 2006.
28. “Biocompatible Quantum Dots for Electrical Stimulation of Neural Cells,” **SPIE Photonics West**, San Jose, CA, Jan. 2005.

**Invited External Seminars**

1. “Twenty Years Later: Why No Clinical Quantum Dot Imaging Labels,” Biophysics, **Case Western Reserve University**,” Cleveland, OH, February 4, 2020.
2. “Encapsulating Hydrophobic Cargoes in Micelles via Scalable Nanomanufacturing Approaches,” Process Technology Institute, **TU Delft**, Delft, Netherlands, June 13, 2019. [Van T’Hoff Lecture]
3. “Transport at the Nanoscale via Biomimetic and Engineered Fields,” Center for Integrated Nanotechnology, **Sandia National Lab,** Los Alamos, NM, May 16, 2019.
4. “Role of Mechanics in the Cancer Microenvironment: Cautionary Tales,” Biomedical Engineering, **Cleveland State University**, Cleveland, OH, April 18, 2019.
5. “Twenty Years Later: Why No Clinical Quantum Dot Imaging Labels?” Chemical Engineering, **West Virginia University**, Morgantown, WV, March 8, 2019.
6. “Polymer Nanoparticle Composites for Bio-applications,” Chemical Engineering, **Texas Tech University**, Lubbock, TX, March 1, 2019.
7. “Quantum Dots for Clinical Cancer Pathology,” Chemical Engineering, **University of Cincinnati**, Cincinnati, OH, November 30, 2018.
8. “Nanoparticle Labels for Cancer Diagnostics,” **University of Toledo**, Toledo, OH, November 15, 2018.
9. “Cellular and Molecular Biosensing Using Magnetic Quantum Dots,” **University of Minnesota**, Minneapolis, MN, November 14, 2017.
10. “Battling Cancer through Chemical Engineering: A Bench to Bedside Journey,” **Colorado School of Mines**, Golden, CO, October 6, 2017.
11. “Battling Cancer: From the Bench to the Bedside”, William Fowler Science Series, **The Ohio State University – Lima**, Lima, OH, November 29, 2016.
12. “High Throughput Nanocomposite Manufacturing Using Spray Technologies,” **Ohio University**, Athens, OH, September 20, 2016.
13. “Ordered Templating in Nanoparticle Composites,” **New Mexico Highlands University**, Las Vegas, NM, April 27, 2016.
14. “From the Bench to the Bedside: Scalable Nanomanufacturing of Nanoparticle Reagents for Clinical Imaging,” **Washington University, St. Louis**, St. Louis, MO, March 24, 2016.
15. “From Chemical Engineer to Cancer Warrior,” **Museum of Science, Boston**, Boston, MA, March 26, 2016. (https://www.youtube.com/watch?v=i2KjYYPW\_dw)
16. “Nanoparticle-Block Co-Polymer Interactions in Solution Phase,” **University of Illinois-Chicago**, Chicago, IL, February 18-19, 2015.
17. **Heaven-and-Earth Distinguished Lecture**,“Nanomaterials in Bioengineering: Tissue Engineering, Drug Delivery, and Imaging,” College of Engineering, **Nanjing University**, Nanjing, China, September 25-26, 2014.
18. “Toward Nanomachines: Bio-Inspired Assembly, Transport and Manipulation at the Nanoscale,” **Northwestern University**, Evanston, IL, June 4, 2014.
19. “Magnetic Quantum Dots for Imaging, Diagnostics, and Biomechanical Manipulation,” **University of Texas, Austin**, Austin, TX, April 1, 2014.
20. “Integrating Biological and Engineering Transport at the Nanoscale,” **Northwestern University,** Evanston, IL, November 14, 2013.
21. “Engineering a Bio-inspired Nanofactory for Assembly, Capture, and Transport,” **Auburn University**, Auburn, Alabama, October 16, 2013.
22. “Towards an Engineered Nanofactory,” Center for Integrated Nanotechnologies, **Sandia National Laboratories**, Los Alamos, NM, September 11, 2013.
23. “Quantum Dots and Magnetic Quantum Dots for Biomedical Imaging and Separations,” Department of Physics, **Case Western Reserve University**, Cleveland, OH, November 26, 2012.
24. “Nanotechnology for Neural Engineering,” Department of Biomedical Engineering, **Texas A&M University**, College Station, TX, September 10, 2012.
25. “Becoming a Woman Inventor and Entrepreneur,” **Professional Women’s Resource Conference**, Dayton, OH, February 22, 2012.
26. “Nanotechnology for Cancer Detection,” Materials Science Program, **Texas A&M University**, College Station, TX, November 17, 2011.
27. “Multimodal Nanocomposites for In vitro and In vivo Imaging,” Department of Chemical and Biomolecular Engineering, **Ohio University**, Athens, OH, September 28,2010.
28. “Fluorescent-Magnetic Nanoparticle Composites for Imaging, Cell Separation, and Cell Manipulation,” Department of Chemical and Biomolecular Engineering, Department of Biomedical Engineering, **Cornell University**, Ithaca, NY, October 29, 2008. \*ACS Progress Lecture
29. “Nanoparticle-Polymer Composites for Neural Interfaces,” Department of Chemical and Biomolecular Engineering, **Rice University**, Houston, TX, March 20, 2008.
30. “Neural Prostheses at Different Length Scales,” Department of Chemical and Biochemical Engineering, **University of Maryland Baltimore County**, Baltimore, MD, May 7, 2007.
31. "Biodegradable Polymeric Hydrogels for Improved Neuroprosthetic-Tissue Interfaces," Department of Chemistry, **Andrews University**, Berrien Springs, MI, September 7, 2006.

**CHAIR FOR MEETINGS AND SYMPOSIA**

**International**

11th Korea-US Forum on Nanotechnology 2014

 Session Chair, Nanoinformatics

 Discussion Leader, Nanocomposites

International Conference on Biomolecular Engineering

 Session Chair, “Interface of Bionanotechnology and Biomolecules,” 2013

International Conference on Bioengineering and Nanotechnology

 Member, Organizing Committee 2012

 “Nanoparticles, Nanocomposites and Nanoporous Materials for Bio-Applications,” 2012

 (Chair with Seung Wuk Lee, University of California Berkeley).

 “Nanotools for Bioengineering,” (Co-Chair with Sven-Peter Heyn, JPK Instruments) 2008

Monte Verita Conference on Frontiers in Neural Engineering

 “Clinial Neuralprosthetics” 2010

 Judge for Poster Session 2010

**National**

AIChE Annual Meeting

 Session Organizer 2007-2017

 Programming co-chair, Area 22b, Bionanotechnology 2011-2013

BMES Annual Meeting

 “Meet the Faculty Candidate” 2010

 “Nano- and Micro-Engineering in Tissue Engineering – I” 2010

 “Neural Tissue Engineering – II” 2010

ACS Annual Meeting

 “Basic Research in Colloids, Surfactants and Nanomaterials (COLL)” 2014

 “Emerging Technologies (BIOT)” 2014

**EDITOR OF JOURNALS**

Materials Advances- Associate Editor (01/2020-)

Journal of Biomaterials Chemistry B- Associate Editor (07/2018-)

Journal of Materials Chemistry- Executive Board (08/2018-01/2020)

Frontiers in Neuro-engineering- Associate Editor (03/2008-)

Journal of Nanoengineering and Nanosystems- Editorial Board (01/2009-)

**PROFESSIONAL SOCIETIES**

**Leadership Positions**

American Institute of Chemical Engineers (AIChE)

 2020-pres Vice Chair- Chemical Engineering Technical Operating Council (CTOC)

 2017-2020 Appointed Member- Chemical Engineering Technical Operating Council (CTOC)

 2017-2019 Past-Chair- Nanoscale Science and Engineering Forum (NSEF)

 2015-2017 Chair- Nanoscale Science and Engineering Forum (NSEF)

2013-2014 Vice Chair- Nanoscale Science and Engineering Forum (NSEF)

2009-2013 Elected Member-At-Large- Nanoscale Science and Engineering Forum (NSEF)

**Fellow**

American Association for the Advancement of Science (AAAS)

American Institute of Medical and Biological Engineers (AIMBE)

**Senior Member**

IEEE Society for Engineering in Medicine and Biology (EMBS)

American Institute of Chemical Engineers (AIChE)

**Member**

Biomedical Engineering Society (BMES)

American Chemical Society (ACS)

Materials Research Society (MRS)

Society of Women Engineers (SWE)

**TEACHING EXPERIENCE**

**Instructor of Record**

Laboratory Methods in Biochemical Engineering, UG/G, ChBE/BME 694 2010-2013

Cellular Nanotechnology, UG/G, ChBE 735/BME 765 2007-pres

* New Course Based on Instructor Research

Chemical Process Calculations II (Energy Balances), UG, ChBE 201 2007-pres

* + Podcasted lectures, collected statistical data for possible publication
	+ Significantly revamped lectures to include examples from energy, nanotechnology and biology
	+ Contributed problem sets to the BioEMB testbank

http://www.engr.sjsu.edu/~bioemb/

Principles of Biochemical Engineering, UG/G, ChBE 765 2008-2009

**Guest Lectures or Teaching Assistant**

Introduction to Chemical Engineering, UG, ENGINEER 100.03 2006-2009

* 2 guest lectures on biotechnology and nanotechnology

Freshman Seminar on Nanotechnology, UG, ASC 138.07 2007

* Guest lecture on cellular nanotechnology

Introduction to Biomedical Engineering, UG, BME 600 2006

* Guest lecture on nanotechnology for imaging

Cell culture and immunocytochemistry (mini-course), 4 students 2006

**TEACHING HONORS**

Excellence in Undergraduate Mentoring Award 2020

Dave McCarthy Teaching Award 2010

Outstanding Undergraduate Achievement Mentor 2008

**TEACHING PRESENTATIONS**

1. “Using Podcasts in the Classroom,” OSU TELR, (Feb. 11, 2010) J.O. Winter, panelist.
2. “Podcasting in the Introductory Materials and Energy Balance Course,” American Institute of Chemical Engineers Annual Meeting, Salt Lake City, UT (Nov. 6, 2007), J.O. Winter.

**OUTREACH**

Grow Your Mind, Wellington School, 15 students 2018

Mentor, HS Intel/Siemens Talent Search Team 2012-present

Denman Undergraduate Research Forum Judge 2009-present

COSI (Columbus Area Science Museum) Nanodays- co-organized experimental demonstrations of OSU NSEC technology 2008-2016

Museum of Science Boston, participated in science podcast 2016

Museum of Science Boston, collaborated to develop new floor show exhibit for MOS Nanodays 2015-2016

COSI-OSU Liason for OSU NSEC 2008-2013

Museum of Science, Boston, Contributed to Development of New Exhibit on Nanotechnology 2012-2013

Science Mentor, New England Institute of Art, Animation Team 2011

 <http://www.qstorm.org/qstorm-animation/>

Co-Designed with Edheads, Educational Software Module, “Nanoparticles and Brain Tumors” <http://www.edheads.org/activities/nano1/index.shtml> 2011

Mentor, home schoolers project on nano-neural prosthetics (3 students, 2 parents) 2010

WiE Change the World Recruitment Event for HS Senior Girls, represented BME department to ~100 girls, voted best department at event 2010

COSI Expert Program- Nanotechnology-Hype vs. Reality videoconference ~ 120 students 2010

Annual Goldberg Lecture- Wellington High School, “Bionanotechnology” to ~ 100 students 2009

Mentor- Wellington School (high school) AP science project, removing As from water with iron oxide nanoparticles 2009

COSI Academy- Presentation to ~ 15 advanced high school students on nanotechnology 2008

Chemical Engineering Women’s Group, Advisor 2008

OSU Wonders of Our World Outreach to K-8 Experimental Design 2007-2008

Judge for Freshman Engineering Honors Nanotechnology Competition 2007, 2008

OSU Nanoscale Science and Engineering Center (NSEC) Outreach to Columbus Area Schools Summer Workshop 2007

Faculty Mentor Graduate Women in Science and Engineering Subgroup 2007

Created and Demonstrated Science Teaching Modules to Pre-K Students (4-5 year olds) Wellington School, Columbus, OH 2007

Northwestern University Alumni Extern Program, Mentored 1 undergraduate 2005

IGERT Panel “Applying for Academic Positions” ~ 20 Graduate Students (Invited) 2004

Women in Engineering Program, Presentation “Tissue Engineering and Biomedical Engineering” ~ 100 Female High School Juniors 2003

Austin Area Regional Science Fair, Judge, Biochemistry Division 2003

UT Engineering Mentoring Program for Female Minority High School Students Mentored 3 Students 2001

Graduate Recruiting Chemical Engineering, Student Co-Chair 2001

Explore UT, Presentation “Tissue Engineering” ~ 40 Persons 2000

NexTech Technology Conference, Presentation “Build Your Own Body Parts” ~ 100 High School Students 2000

Texas State Science Fair, Judge, Biology and Overall Divisions 2000