

CURRICULUM VITAE
Randolph S. Ashton, Ph.D.

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EDUCATION:

University of California Berkeley, Postdoctoral Fellow *2007 – 2011*
Berkeley, California, Advisor: David Schaffer

- Postdoc at the California Institute for Quantitative Biosciences (QB3) and Berkeley Stem Cell Center.

Rensselaer Polytechnic Institute, PhD (Chemical Engineering) *2002 - 2007*
Troy, New York, Advisor: Prof. Ravi S. Kane

- Graduated from Chemical and Biological Engineering program with an emphasis in biotechnology and stem cell research.

Hampton University, BS (Chemical Engineering) *1999 - 2002*
Hampton, Virginia

- Graduated Summa Cum Laude, in three years, with a cumulative GPA of **3.9/4.0**

PROFESSIONAL APPOINTMENTS:

Faculty, Material Science Program *2015 - Present*
University of Wisconsin–Madison

Faculty, Neuroscience Training Program *2015 - Present*
University of Wisconsin–Madison

Investigator, Waisman Center *2015 - Present*
University of Wisconsin–Madison

Assistant Professor, University of Wisconsin–Madison *2011 - Present*
Department of Biomedical Engineering (BME) & Wisconsin Institute for Discovery (WID)

HONORS AND AWARDS:

- National Science Foundation Faculty Early CAREER Development Award *2017 - 2022*

- 2016 Young Investigator Faculty Award, Regenerative Medicine Workshop at Hilton Head, SC. 2016
- 2015 Emerging Investigator, *Chemical Communications* (RSC Journal, IF: 6.718) 2015
- Burroughs Wellcome Fund Innovator in Regulatory Science 2014 - 2019
- Rising Star Award, BMES's Cellular and Molecular Bioengineering SIG 2013
- Alumnus of the Year, Richmond Area Program for Minorities in Engineering 2012
- NIH Postdoctoral Fellow, National Heart Lung and Blood Institute (NHLBI) 2009 - 2011
- California Institute for Regenerative Medicine (CIRM) Postdoctoral Fellow 2008 - 2009
- NIH-NIGMS Biomolecular Science and Engineering Training Fellow 2004 - 2006
- Ford Fellowship Pre-Doctoral Fellowship Honorable Mention 2004
- NSF Graduate Research Fellowship Honorable Mention 2004
- Rensselaer Polytechnic Institute Dean Fellowship Recipient 2002 - 2007
- National Consortium for Graduate Degrees for Minorities in Engineering Fellow 2002 - 2004
- Howard P. Isermann Graduate Fellow 2002 -2003
- Rhodes Scholar State Finalist 2002
- Hampton University Presidential Scholar 1999 - 2002

PUBLICATIONS: (*Co-authorship)

22. Marti-Figueroa CR and **Ashton RS** (2017). The Case for Applying Tissue Engineering Methodologies to Instruct Human Organoid Morphogenesis. *Acta Biomaterialia*. *Accepted*.
21. Lippmann ES, Estevez-Silva MC, **Ashton RS** (2015). Chemically defined differentiation of human pluripotent stem cells to hindbrain and spinal cord neural stem cells with defined regional identities. *Protocol Exchange*. [doi:10.1038/protex.2015.076]
20. Harkness T, McNulty JD, Prestil R, Seymour SK, Klann T, Murrell M, **Ashton RS**, Saha K (2015). High-content imaging with micropatterned multiwell plates reveals influence of cell geometry and cytoskeleton on chromatin dynamics. *Biotechnology Journal* 10(10): 1555-1567. [PMID: 26097126]
19. Lippmann ES, Williams CE, Ruhl DA, Estevez-Silva MC, Chapman ER, Coon JJ, **Ashton RS** (2015). Deterministic *HOX* patterning in human pluripotent stem cell-derived neuroectoderm. *Stem Cell Reports* 4(4): 632-44. [PMID: 25843047]
18. Knight GT, Sha J, **Ashton RS** (2015). Micropatterned, clickable culture substrates enable in situ spatiotemporal control of human PSC-derived neural tissue morphology. *Chem Commun* 51(25): 5238-41. [PMID: 25688384]

17. Saraswathy M, Knight GT, Pilla S, **Ashton RS**, and Gong S (2015). Multifunctional drug nanocarriers formed by cRGD-conjugated β CD-PAMAM-PEG for targeted cancer therapy. *Colloids Surf. B* 126: 590-97. [PMID: 25591850]
16. Knight GT, Klann T, McNulty JD, **Ashton RS** (2014). Fabricating Complex Culture Substrates Using Robotic Microcontact Printing (R- μ CP) and Sequential Nucleophilic Substitution. *J. Vis. Exp.* (92), e52186. [doi:10.3791/52186; PMID: 25407245]
15. McNulty JD*, Klann T*, Sha J, Salick M, Knight GT, Turng L, **Ashton RS** (2014). High-precision robotic microcontact printing (R- μ CP) utilizing a vision guided selectively compliant articulated robotic arm. *Lab Chip* 14(11): 1923-30. [PMID: 24759945]
14. Salick M, Napiwocki BN, Sha J, Knight GT, Chindhy SA, Kamp TJ, **Ashton RS**, Crone WC (2014). Micropattern width dependent sarcomere development in human ESC-derived cardiomyocytes. *Biomaterials* 35(3): 4454-64. [PMID: 24582552]
13. Lippmann ES, Estevez-Silva MC, **Ashton RS** (2014). Defined human pluripotent stem cell culture enables highly efficient neuroepithelium derivation independent of small molecule inhibitors. *Stem Cells* 32(4): 1032-42. [PMID: 24357014]
12. Vazin T*, **Ashton RS***, Conway A, Rode N, Lee SM, Bravo V, Healy KE, Kane R, Schaffer DV (2014). Multivalent sonic hedgehog enhances differentiation of human embryonic stem cells into dopaminergic and GABAergic neurons. *Biomaterials* 35(3): 941-8. [PMCID: 24172856]
11. Sha J, Lippmann ES, McNulty J, Ma Y, **Ashton RS** (2013). Sequential nucleophilic substitutions permit orthogonal click functionalization of multicomponent PEG brushes. *Biomacromolecules* 14(9): 3294-303. [PMCID: 23937610]
10. **Ashton RS***, Conway A*, Pangakar C, Bergen J, Lim K, Shah P, Bissell M, Schaffer DV (2012). Astrocytes regulate adult hippocampal neurogenesis through ephrin-B signaling. *Nat Neurosci* 15(10): 1399-406. [PMCID: 22983209]
9. Pollock JF, **Ashton RS**, Rode NA, Schaffer DV, Healy KE. Molecular characterization of multivalent bioconjugates by size-exclusion chromatography with multiangle laser light scattering (2012). *Bioconjugate Chem* 23(9): 1794-801. [PMCID: 22794081]
8. **Ashton RS**, Keung AJ, Peltier J, Schaffer DV (2011). Progress and prospects in stem cell engineering. *Annu Rev Chem Biomol Eng* 2: 479-502. [PMCID: 22432628]
7. Banerjee, A., Arha, M., Choudhary, S., **Ashton, R.S.**, Bhatia, S.R., Schaffer, D.V., Kane, R.S. (2009). The influence of hydrogel modulus on the proliferation and differentiation of encapsulated neural stem cells. *Biomaterials* 27: 4695-99. [PMCID: 19539367]
6. Wall ST, Saha KS, **Ashton RS**, Kim K, Schaffer DV, Healy KE (2008). Multivalency of sonic hedgehog conjugated to linear polymer chains modulates protein potency. *Bioconjugate Chem.* 19: 806-12. [PMCID: 18380472]

5. **Ashton RS**, Banerjee A, Punyani S, Schaffer DV, Kane RS (2007). Scaffolds based on degradable alginate hydrogels and poly(lactide-co-glycolide) microspheres for stem cell culture. *Biomaterials*, 28: 5518-25. [PMCID: 17881048]
4. **Ashton RS**, Peltier J, Fasano CA, O'Neill A, Leonard J, Temple S, Schaffer DV, Kane RS (2007). High-throughput screening of gene function in stem cells using clonal microarrays. *Stem Cells* 25: 2928-35. [PMCID: 17673524]
3. Rai PR, Saraph A, **Ashton R**, Poon V, Mogridge J, Kane RS (2007). Raftlike polyvalent inhibitors of anthrax toxin: modulating inhibitory potency by formation of lipid microdomains. *Angew Chem Int Ed Engl.* 46: 2207-09. [PMCID: 17310484]
2. Gujraty KV, **Ashton R**, Bethi SR, Kate S, Faulkner CJ, Jennings GK, Kane RS (2006). Thiol-mediated anchoring of ligands to self-assembled monolayers for studies of biospecific interactions. *Langmuir* 22:10157-62. [PMCID: 17107015]
1. **Ashton R**, Padala C, and Kane RS (2003). Microfluidic separation of DNA. *Curr Opin Biotechnol.* 14: 497-504. [PMCID: 14580579]

PATENTS:

4. **Ashton RS**, McNulty JD, Marti-Figueroa CR, Turng L (2016). Water-soluble thermoplastic-divalent cation templates and related methods. U.S. Patent App. No. 14/961033.
3. **Ashton RS**, Lippmann ES, and Seghal N (2016). Methods for efficient derivation of human motor neurons from diverse spinal regions. U.S. Provisional Patent App. No. 62/317115.
2. **Ashton RS** and Lippmann ES (2014). Compositions and Methods for Precise Patterning of Posterior Neuroectoderm From Human Pluripotent Stem Cells, U.S. Patent App. No. 14/496796.
1. **Ashton RS** and Lippmann ES (2013). Simplified Compositions and Methods for Generating Neural Stem Cells From Human Pluripotent Stem Cells, U.S. Patent App. No. 13/795485.

RESEARCH PRESENTATIONS – REGIONAL, NATIONAL, & INTERNATIONAL:

1. Randolph Ashton. **Company of Biologist Workshop, ‘Thinking beyond the dish: taking in vitro neural differentiation to the next level’**. West Sussex, UK. 04-08 February 2018. (*Invited*)
2. Randolph Ashton. “Engineering CNS Morphogenesis Ex Vivo”. **Rutgers University**, Piscataway, NJ, 20 March 2017. (*Invited*)
3. Randolph Ashton. “Engineering CNS Morphogenesis Ex Vivo”. **2017 Society of Toxicology**, Baltimore, MD, 15 March 2017. (*Invited*)
4. Randolph Ashton. “Derivation of a Spectrum of Regional Motor Neuron Phenotypes for

Hindbrain and Spinal Cord Regenerative Medicine”, **LifeNet Health Regenerative Medicine Institute**, Virginia Beach, VA, 09 November 2016. (*Invited*)

* Founded in 1982, LifeNet is a non-profit organ procurement organization providing donation systems for heart, liver, kidney, pancreas, lung, and other organs for transplant. It is the world's largest provider of allograft bio-implants and organs for transplantation.

5. Randolph Ashton. “At the Stem Cell-Biomaterial Interface: Engineering CNS Tissue Morphogenesis Ex Vivo”, **University of Tübingen Women’s Hospital/Fraunhofer IGB’s Medical Technology Course**, Tübingen, Germany, 18 October 2016. (*Invited*)
6. Gavin Knight, Carlos Marti-Figueroa, Jason McNulty, Jake Tokar, Ethan Lippmann, David Beede, Lih-Sheng Turng, and Randolph Ashton. “Engineering CNS Tissue Morphogenesis *In Vitro*”, **2016 Biomedical Engineering Society Meeting**, Minneapolis, MN, 08 October 2016. (*Invited* ‘*Integration of Developmental Biology and Morphogenesis in Tissue Engineering*’ Session Keynote)
7. Randolph Ashton, “Engineering CNS Tissue Morphogenesis Ex Vivo”, **Department of Biomedical Engineering, Yale University**, New Haven, CT, 20 September 2016. (*Invited*)
8. Randolph Ashton, “Engineering CNS Tissue Morphogenesis Ex Vivo”, **Department of Biomedical Engineering, Carnegie Mellon University**, Pittsburg, PA, 13 September 2016. (*Invited*)
9. Randolph Ashton, “Recapitulating CNS Tissue Development In Vitro Using Engineered Biomaterials”, **Gordon Research Conference on Signal Transduction by Engineering Extracellular Matrices**, Biddeford, ME, 27 June 2016. (*Invited*)
10. E. S. Lippmann, N. Sehgal, M.C. Estevez-Silva, C.E. Williams, D.A. Ruhl, M.A. Bakooshli, G.T. Knight, K. Lemke, J. Plantz, E.R. Chapman, P.M. Gilbert, J.J. Coon, and R.S. Ashton, “Harnessing Wnt/b-catenin Signaling to Enable Highly Efficient Derivation of Human Motor Neurons from any Spinal Cord Region”, **International Society for Stem Cell Research Annual Meeting**, San Francisco, CA, 24 June 2016. (*Oral*)
11. Randolph Ashton, “Engineering Region-specific Cells and Tissue Models for Hindbrain and Spinal Cord Regenerative Medicine”, **University of California Berkeley Stem Cell Center Retreat at Asilomar Conference Center**, Pacific Grove, CA, 24 April 2016. (*Invited*)
12. Randolph Ashton, “Highly Efficient Derivation of Regional Motor Neuron Phenotypes for Hindbrain and Spinal Cord Regenerative Medicine”, **Regenerative Medicine Workshop**, Hilton Head, SC, 19 March 2016. (*Invited, Young Faculty Award Keynote Lecture*)
13. Randolph Ashton, “Engineering Region-specific Cells and Tissue Models for Hindbrain and Spinal Cord Regenerative Medicine”, **J. Crayton Pruitt Family Department of Biomedical Engineering, University of Florida**, Gainesville, FL, 25 February 2016. (*Invited*)
14. Randolph Ashton, “Region-specific Cells and Tissue Models for Hindbrain & Spinal Cord Regenerative Medicine”, **Waisman Center and Allen Institute Neuroscience Symposium and Training, UW-Madison**, Madison, WI, 16 October 2015. (*Invited*)

15. Randolph Ashton, “Brain Models for Analysis of Pathways (BRAIN MAPS)”, **Environmental Protection Agency’s National Center for Computational Toxicology**, Virtual Tissue Models Meeting Webinar, 14 October 2015. (*Invited*)
16. Randolph Ashton, “Engineering Hindbrain and Spinal Cord Tissues for Toxicology and Regenerative Medicine”, **2nd Annual Chemical Engineering Alumni Research Symposium, Hampton University**, Hampton, VA, October 2015. (*Invited*)
17. E.S. Lippmann, G.T. Knight, M.C. Estevez-Silva, C.E. Williams, M.A. Bakooshi, D.A. Ruhl, E.R. Chapman, P.M. Gilbert, J.J. Coon, R.S. Ashton. “Region-Specific Cells and Tissue Models for Hindbrain and Spinal Cord Regenerative Medicine”, **4th Tissue Engineering and Regenerative Medicine International Society (TERMIS) World Congress, Boston, MA**, September 2015 (*Oral*)
18. Randolph Ashton, “From Niche to Tissue: Engineering Neural Stem Cell Derivation, Differentiation, and Tissue Morphogenesis”, **Gordon Research Conference on Biomaterials & Tissue Engineering, Girona, Spain**, July 2015 (*Invited*)
19. Randolph Ashton, “Engineering Region-Specific Cells and Organotypic Tissues of the Central Nervous System”, **International Society for Stem Cell Research 2015 Annual Meeting: Stem Cell Engineering Focus Session**, Stockholm, Sweden, June 2015 (*Invited*)
20. Randolph Ashton, “Engineering Region-specific Cells and Organotypic Tissues of the Central Nervous System”, **Rensselaer Polytechnic Institute’s Bioengineering and Stem Cell Research Symposium**, Troy, NY, June 2015 (*Invited*)
21. Randolph Ashton, “At the Stem Cell-Biomaterial Interface: Engineering Organotypic Tissue Models”, **Biotechnology Training Program’s ‘Advances in Biotechnology’ Seminar Series, Northwestern University**, Evanston, IL, May 2015. (*Invited*)
22. ES Lippmann, CE Williams, MC Estevez-Silva, JJ Coon, RS Ashton. “Regional Specification of Hindbrain and Spinal Cord Neural Stem Cells derived from Human Pluripotent Stem Cells”, **Tissue Engineering and Regenerative Medicine International Society, Washington DC**, December 2014. (*Oral*)
23. Randolph Ashton, “ Engineering Next Generation CNS Tissue Models”, **American Chemical Society Rock River Section Regional Meeting, Rockford University, Rockford, IL**, October 2014. (*Invited*)
24. Randolph Ashton, "Engineering Next Generation CNS Tissue Models", **UW Madison’s Stem Cell & Regenerative Medicine Center Fall Conference, Madison, WI**, September 2014. (*Invited*)
25. Randolph Ashton, "Engineering Next Generation CNS Tissue Models", **Cellular Dynamics International, Madison, WI**, July 2014. (*Invited*)

26. Randolph Ashton, “Clinically Translatable Protocols for Generating Region-Specific Hindbrain and Spinal Cord Tissues”, **International Collaboration on Repair Discoveries (ICORD), Vancouver, Canada**, June 2014. (*Invited*)
27. E.S. Lippmann, M. Estevez-Silva, R.S. Ashton. “Translatable Protocols for Derivation of Hindbrain and Spinal Cord Cellular Therapeutics”, **Regenerative Medicine Workshop, Hilton Head, SC**, March 2014. (*Invited*)
28. Randolph Ashton, “Designing and Monitoring 3-D Cellular Microenvironments”, **Rehabilitative and Regenerative Medicine for Minority Health and Health Disparities: a Frontiers Advanced Training Course, Howard University**, December 2013. (*Invited*)
29. Randolph Ashton, “Designing 1-D and 2-D molecular interfaces for tissue engineering”, **International Summer School: “From 2D biology to 3D Medical Solutions”**, Vipava, Slovenia, August 2013. (*Invited*)
30. E.S. Lippmann, M. Estevez-Silva, R.S. Ashton. “Novel and Scalable Derivation of Neuroepithelium and Ventral Progenitors of Defined Spinal Cord Position”, **Annual Biomedical Engineering Society Meeting, Seattle, WA**, September 2013. (*Oral*)
31. Randolph S. Ashton, “Towards Engineering Biomimetic Central Nervous System Tissue”, **Department of Biomedical Engineering, Northwestern, Evanston, IL**, January 2013. (*Invited*)
32. Randolph S. Ashton, “Towards Engineering Biomimetic Central Nervous System Tissue”, **UW Madison Cell & Regenerative Biology Departmental Seminar, Madison, WI**, November 2012. (*Oral*)
33. Randolph S. Ashton, “Astrocytes Regulate Adult Hippocampal Neurogenesis Through Ephrin-B Signaling”, **UW Madison Biomedical Engineering Departmental Seminar, Madison, WI**, October 2011. (*Oral*)
34. Randolph S. Ashton, “Modeling the Body’s Blueprint for Instructing Stem Cell Fate”, **MathBio3: Modeling Conference, UW Madison, Madison, WI**, September 2011. (*Invited*)
35. Randolph S. Ashton, “Towards Engineering Instructive Cellular Microenvironments: Case Studies in Neurogenesis”, **University of Wisconsin’s Stem Cell and Regenerative Medicine Center Stem Cell Lab Meetings, Madison, WI**, September 2011. (*Oral*)
36. Randolph S. Ashton, “Engineering the Neurogenic Cellular Microenvironment”, **International Consortium of Stem Cell Networks/CIRM Postdoctoral Symposium, San Francisco, CA** 2010. (*Invited*)
37. Randolph S. Ashton, Samuel Wall, Krishanu Saha, Kevin Healy, Ravi S. Kane, David Schaffer. “Multivalency Enhances the In Vitro Potency of Recombinant Sonic Hedgehog in Dopaminergic Differentiation of Human Embryonic Stem Cells”, **ISSCR 8th Annual Meeting, San Francisco, CA** 2010. (*Poster*)
38. Randolph S. Ashton, Samuel Wall, Krishanu Saha, Kevin Healy, Ravi S. Kane, David Schaffer. “Multivalency Enhances the In Vitro Potency of Recombinant Sonic Hedgehog in Dopaminergic Differentiation of Human Embryonic Stem Cells”, **Society for Biological Engineers 2nd International Conference on Stem Cell Engineering, Boston, MA** 2010. (*Poster*)

39. Randolph S. Ashton, “Designing Biomaterials to Investigate Factors that Control Stem Cell Fate”, **Rensselaer NIH Biomolecular Science and Engineering Training Retreat, Troy, NY 2008.** (*Invited*)
40. Randolph S. Ashton, Peltier Joe, Fasano Christopher, O’Neill Analeah, Temple Sally, Schaffer David V., Kane Ravindra S. “Stem Cell Microarrays: Investigation of Factors that Influence Neural Stem Cell Fate”, **232ND ACS National Meeting, San Francisco, CA 2006.** (*Oral*)

PROFESSIONAL ACTIVITIES:

Grant Review Panels

- *Ad Hoc*, NIH Bioengineering of Neuroscience, Vision, and Low Vision Technologies (BNVT) Study Section *Feb 2017*
- NSF Biomedical Engineering Program *Feb 2017*
- NSF Graduate Research Fellowship *Jan 2017*
- NSF Neural Systems Program CAREER *Oct 2016*
- NIH Special Emphasis Panel: Enabling Bioanalytical and Imaging Technologies (ZRG1 EBIT-R 09 F) *Oct 2015*
- NIH-National Cancer Institute, Special Emphasis Review Panel Mouse Models-Molecular Mechanisms of Therapy *Jul 2015*
- Maryland Stem Cell Research Foundation *Apr 2014, March 2016, March 2017*

Memberships

- Society for Neuroscience *2015 - Present*
- Tissue Engineering and Regenerative Medicine International Society (TERMIS) *2014 - Present*
- Biomedical Engineering Society (BMES) *2010 - Present*
- Society for Biological Engineers (SBE) *2008 - 2010*
- American Institute for Chemical Engineers (AIChE) *2006 - 2011*
- International Society for Stem Cell Research (ISSCR) *2006 - Present*

Service

- 11th Annual Wisconsin Stem Cell Symposium, Co-Organizer *Apr. 2016*
- BMES Annual Meeting, ‘Stem Cells in Tissue Engineering’ and ‘Cell Adhesion and Interactions with the Extracellular Matrix II’ Session Chair *Oct. 2015*
- 4th TERMIS-WORLD Congress, Co-Chair of ‘Translation Tissues and Materials for Neural Repair’ track (Neural & Spine TWIG) *Sept. 2015*
 - Successfully solicited \$25,000 sponsorship from the Burroughs Wellcome Fund.
- TERMIS-AM Meeting, Student and Young Investigator Section (SYIS) Poster Judge *Dec. 2014*

UW Madison:

- Black Graduate & Profession Student Association, Faculty Advisory Board *2015 - Present*
- Commission on Faculty Compensation and Economic Benefit *2013 - 2017*
- Stem Cell & Regenerative Medicine Center's Executive Committee *2013 - Present*
- Stem Cell & Regenerative Medicine Center's Bioengineering Focus Group *2012 - Present*
- Stem Cell & Regenerative Medicine Center's Neural Regeneration Focus Group *2012 - Present*

National:

- TERMIS Neural and Spine Thematic Working Interest Group, Chair *2015 - Present*
- Hilton Head Regenerative Medicine Workshop, Organizing Committee *2014, 2016, 2017*

RESEARCH SUPPORT:**Active:**

- 1R21NS082618-01A1 (PI- Ashton, Co-I- Beebe) *8/01/2014 – 05/31/2017*
NIH/NINDS *\$174, 211/yr.; 1.5 calendar*
\$119,406/yr. (DC)
“High-Throughput Modeling of ALS Using iPSC-derived Neural Tube Microarrays”
The major goals of this project are to create microfluidic arrays containing 2D morphogenetically patterned hindbrain and spinal cord tissues and use these ‘neural tube microarrays’ to model Amyotrophic Lateral Sclerosis (ALS).
- Innovations in Regulatory Science (PI- Ashton, Co-I- Saha) *09/01/2014 – 08/31/2019*
Burroughs Wellcome Fund *\$100,000/yr. (DC); 1.5 calendar*
“Organoid Microarrays for Pan-Hindbrain and Spinal Cord Screening”
The major goal of this proposal is to develop a standardized and high-throughput screening platform containing an array of 3D hindbrain and spinal cord organoids derived from human pluripotent stem cells for applications in regulatory sciences.
- EPA-G2013-STAR-L1 (Project PI- Ashton, Co-I- Saha) *12/01/2014 – 11/30/2018*
EPA Center, Director- Murphy (\$5,999,999) *\$1,179,097; 1.0 calendar*
\$794,191 (DC)
“Brain Models for Analysis of Pathways”
The major goal of this proposal is to generate a high-throughput screening platform composed of 3D models of brain tissues to identify environmental toxins that damage midbrain dopaminergic neurons and thereby could potentially cause Parkinsonian symptoms or disease.
- 1R01GM110567-01A1 (PI- Audhya, Co-I- Ashton, Otegun) *03/01/2015 – 01/31/2019*
NIH/NIGMS *\$ 6,174 (DC); 0.45 calendar*
“Regulatory mechanisms that control vesicle secretion at the endoplasmic reticulum”

The long-term goals of this proposal are to define the molecular mechanisms that regulate the spatial distribution of organelles in the early secretory pathway and to determine the importance of this architecture to normal membrane trafficking during cell growth and development.

- Innovation Grant (PI-Ashton) 09/01/2016 – 08/30/2017
UW-Madison Division of Diversity, Equity, & Educational Achievement \$ 4860.73 (DC)
“Biomedical Engineering Diversity Outreach Program”
The goal of this project is to increase STEM outreach amongst underrepresented high school students in Madison and Milwaukee, Wisconsin to increase undergraduate applicants to UW-Madison College of Engineering.
- NSF CAREER, 1651645 (PI-Ashton) 07/01/2017 – 06/30/2022
NSF, CBET Division, BME Program \$553,221; 0.5 Summer
“CAREER: Engineering CNS Morphogenesis Ex Vivo: Spinal Cord”
The major goals of this project are to engineer 3-D spinal cord organoids with biomimetic tissue structure, D//V & R/C cytoarchitecture, and neuronal circuitry.

Pending:

- R33 (PI– Ashton, Co-I– Beebe, Zhang) 05/31/2017 – 05/30/2019
NIH/NINDS \$767,365; 2.0 calendar
“High-Throughput Modeling of ALS Using iPSC-derived Neural Tube Microarrays”
The major goals of this project are to create microfluidic arrays containing 2D morphogenetically patterned hindbrain and spinal cord tissues and use these ‘neural tube microarrays’ to model Amyotrophic Lateral Sclerosis (ALS).

Completed:

- Fall Research Competition (PI– Ashton) 7/01/2013 – 6/30/2014
UW Madison Graduate School \$57,134 (DC); 0 calendar
“Engineering hydrogels for scalable microvasculature production”
The major goals of this project were to modify alginate hydrogels to support endothelial cell culture, develop a micro-injection molding procedure to create polyvinyl alcohol sacrificial lattices, and combine the technologies to create vascularized hydrogels.
- Draper Technology Innovation Fund (PI– Ashton) 9/01/2013 – 6/30/2014
Wisconsin Alumni Research Foundation \$50,000 (DC); 0 calendar
“Delineating morphogen regulation of Hox genes in hPSC-derived hindbrain and spinal neuronal cultures”
This was awarded to execute experiments that would provide data to better protect our novel NSC derivation protocol during patenting efforts.
- ICTR Basic Research Awards Program (Co-PI– Mitchell & Ashton) 7/01/2014 – 12/31/2015
UW Madison \$50,000 (DC); 0 calendar
“Phrenic Motor Neuron Derivation and Transplantation”

The major goals of this proposal are to develop the first-ever protocol for deriving phrenic motor neurons from hPSCs and test whether acute intermittent hypoxia treatments will enhance their engraftment upon transplantation.

- RIC Type 1 Award (PI– Saha, Co-I– Ashton, Ansari) 06/01/2015 – 05/30/2016
UW-Madison College of Engineering \$44,424 (DC); 0 calendar
“Advance Biomanufacturing of Gene-Edited Human Cells”
The major goal of this project was to develop a high-throughput method for performing CRISPR/Cas9 genome editing and cell phenotype selection of human pluripotent stem cells.
- ICTR Novel Methods Award Program (PI– Saha, Co-I– Ashton, Chang) 08/01/2015 – 07/31/2016
UW-Madison \$10,000 (DC); 0 calendar
“Probing Neuronal Complexity Deeper and Faster”
The major goal of this project was to develop and automate, high-throughput method for analyzing neurite morphology within human pluripotent stem cell-derived neuronal cultures.

TEACHING:

Courses:

- BME 430, Biological Interactions with Materials 2017
- BME 520, Stem Cell Bioengineering 2013 - 2016
- BME 200/300, Biomedical Engineering Design 2011- 2015
- BME 701, Biomedical Engineering Seminar 2015 - 2016

Guest Lectures:

- ANA 675: Molecular & Cellular Organogenesis 2012
- BME 517: Biology in Engineering Seminar 2012, 2016
- BME 510: Introduction to Tissue Engineering 2011-2013

Workshops:

- Lecture and lab on “Engineering the Stem Cell-Biomaterial Interface”,
Rehabilitative and Regenerative Medicine for Minority Health and Health
Disparities: Frontiers Advanced Training Course
(Howard University, Washington, DC) December 2013
- Lectures and lab on “Engineering the Stem Cell-Biomaterial Interface”,
International Summer School entitled “From 2D to 3D Medical Solutions”
(Vipava, Slovenia) August 2013

Undergraduate Student Advising/Mentoring:

- Akshitha Sreeram, Dept. of Neuroscience 2014 - Present
 - Wisconsin Hilldale Undergraduate/Faculty Research Fellowship 2016 – 2017

UW Madison	\$4,000	
• Joshua Plantz, Dept. of Biomedical Engineering		2014 - Present
• Brady Lundin, Dept. of Biomedical Engineering & Biochemistry		2014 - Present
○ Wisconsin Hilldale Undergraduate/Faculty Research Fellowship	2016 – 2017	
UW Madison	\$4,000	
• Matthew Walker, Dept. of Biomedical Engineering		2013 - 2013
• Tyler Klann, Dept. of Biomedical Engineering		2012 - 2013
• Zeeshan Yacoob, Dept. of Biology		2011 - 2014
○ Wisconsin Hilldale Undergraduate/Faculty Research Fellowship	2013 – 2014	
UW Madison	\$3,500	
○ Undergraduate Certificate of Excellence in Stem Cell Sciences		
• Maria Estevez, Dept. of Biomedical Engineering		2011 - 2015
○ Wisconsin Hilldale Undergraduate/Faculty Research Fellowship	2014 – 2015	
UW Madison	\$4,000	

Graduate Student Advising/Mentoring:

• Brett Napiwoki, Biomedical Engineering (co-advised by Crone)		2015 - Present
• Katherine Jeffris, Biomedical Engineering		2015 - Present
• Julio Cesar Diaz, Neuroscience Training Program		2015 - Present
• Sayeed Alireza AghayeeMeibody, Material Science and Engineering		2015 - Present
• Tyler Klann, Dept. of Biomedical Engineering (M.S., co-Advisor)		2013 - 2014
• Carlos Marti-Figueiroa, Dept. of Biomedical Engineering (Ph.D.)		2013 - Present
• Jason McNulty, Dept. of Mechanical Engineering (co-advised by Turng, Ph. D.)		2012 - 2015
• Gavin Knight, Dept. of Biomedical Engineering (Ph.D.)		2012 - Present
○ SCRMC Fall Conference Poster Winner	2014	
UW Madison, Gregory F. Daniels Travel Award	\$1000	
• Jin Sha, Visiting Scholar in Dept. of Mechanical Engineering		2011- 2013

Postdoctoral Trainee Advising/Mentoring:

• Neha Sehgal		2015 - 2016
• Ethan Lippmann		2012 - 2015
○ SCRMC Postdoctoral Fellowship (Advisor-Ashton)	12/01/2012 – 11/30/2013	
UW Madison Stem Cell Stem Cell & Regenerative Medicine Center	\$40,548	
○ 1F32NS083291-01A1 (Co-Advisors– Ashton & Zhang)	12/01/2013 – 11/30/2016	
NIH/NINDS	\$177,135	

Ashton Lab Alumni

- Jason D. McNulty, PhD, Senior Molding Engineering, 3M
- Ethan Lippmann, Assistant Professor, Vanderbilt University (Tenure-Track)
- Tyler Klann, Dept. of Biomedical Engineering, Duke University (Ph.D. program)
- Jin Sha, Room 515, 17th Experimental Building, School of Mechanical and Power Engineering East China University of Science & Technology, 130 Meilong Road, Shanghai 200237, P. R. China
Tel:021-64252363 (Research Faculty)

VOLUNTEER SERVICE:

- UW–Madison Admitted Student of Color Engineering Preview Day, Presenter *Apr. 2016*
 - STEM Boot Camp Faculty Mentoring Lunch, Mentor *Aug. 2015*
 - UW-Madison PEOPLE Program, Sponsored Lab Visit *Jul. 2015*
 - UW–Madison Peer Learning Association, Lecture on Academic Careers *Apr. 2015*
 - UW–Madison Admitted Student of Color Engineering Preview Day, Presenter *Apr. 2015*
 - SCRMC Fall Conference @ UW Madison, Poster Judge *Sept. 2014*
 - WARF Discovery Challenge @ UW Madison, Poster Judge *May 2014*
 - Verona High School Advanced Biotechnology Class, Guest Lecturer *April 2014*
 - College of Engineering LEEDS Faculty Roundtable *Oct. 2013*
 - 100 BMM’s Madison Youth Congress, Chair *Apr. 2013*
 - Midwest BME Career Conference, Univ. Illinois at Chicago, Panelist *Apr. 2013*
 - Verona High School’s Brothers United, Invited Speaker *Feb. 2013*
 - Martin Luther King Jr. Youth Service Day (Volunteer Presenter) sponsored by the Urban League of Greater Madison and the Wisconsin Institute for Discovery *Jan. 16, 2013*
 - UW Madison Engineering Summer Program, Guest Speaker *Jun. 2012*
 - “Developing Leaders with an Appreciation of STEM” sponsored by the 100 Black Men of Madison and the Wisconsin Institute for Discovery, Organizer *Apr.-May 2012*
 - UW BMES Chapter Spring Banquet, Guest Speaker *May 2012*
 - 100 Black Men of Madison (100 BMM), Member *2012-present*
 - UW Madison College of Engineering Diversity Spring Welcome Career Panel *Jan. 31, 2012*
 - Martin Luther King Jr. Youth Service Day (Volunteer Presenter) sponsored by the Urban League of Greater Madison and the Wisconsin Institute for Discovery *Jan. 16, 2012*
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