Ashley M. Kopec, Ph.D.

Curriculum Vitae

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EDUCATION

2015 Ph.D.; Center for Neural Science, New York University
Title: "Spatiotemporal coordination of growth factor signaling during long-term memory formation in *Aplysia californica*."
Advisor: Dr. Thomas J. Carew

2009 Bachelor of Science in Psychology, Carroll University

RESEARCH AND RELATED TRAINING

2015-present Post-Doctoral Associate*; Dept. of Pediatrics, Harvard Medical School/Massachusetts General Hospital
*moved with laboratory from Duke University (2015-2016) to HMS/MGH (2016-present)

2010-15 Graduate Student; Center for Neural Science, New York University

2013 Advanced Techniques in Molecular Neuroscience, Cold Spring Harbor

2009-10 Clinical Research Coordinator; Epilepsy and Cognition Lab, Massachusetts General Hospital

2008 Amgen Scholar Summer Research Student; Dynamic Neuroimaging lab, University of San Francisco

RESEARCH SUPPORT

2017-present NRSA Post-Doctoral Fellowship; NIDA (F32DA043308)
Title: "Sex-Specific Neuroimmune Molecular Networks Underlying Adolescent Vulnerability to Drugs of Abuse"
Total Funding: ~$57,000/year for up to 3 years

2013-15 NRSA Pre-Doctoral Fellowship; NIMH (F31MH100889)
Title: "Growth Factor Signaling in Two-Trial Long-term Memory formation in *Aplysia*"
Total Funding: ~$85,000

PUBLICATIONS

* Indicates equivalent contributions; ǂ Indicates student mentee contribution

<u>bioRxiv pre-prints</u>

1. **Kopec AM**, Smith CJ, Ayre NRǂ, Sweat SCǂ, Bilbo SD. Microglial elimination of dopamine D1 receptors defines sex-specific changes in nucleus accumbens development and social play behavior during adolescence. bioRxiv 211029; doi: https://doi.org/10.1101/211029

<u>Under Review</u>

1. **Kopec AM**, Smith CJ, Ayre NRǂ, Sweat SCǂ, Bilbo SD. Microglial elimination of dopamine D1 receptors defines sex-specific changes in nucleus accumbens development and social play behavior during adolescence. (Submitted).

2. **Kopec AM**, Fiorentino M, Bilbo SD. (Invited review). Gut-immune-brain dysfunction in Autism: Importance of sex.

Peer-Reviewed Publications

1. Lacagnina MJ, **Kopec AM**, Cox SS, Hanamsagar R, Wells C, Slade S, Grace PM, Watkins LR, Levin ED, Bilbo SD. (2017). Opioid self-administration is attenuated by early-life experience and gene therapy for anti-inflammatory IL-10 in the nucleus accumbens. *Neuropsychopharmacology*, 42(11): 2128-40.

2. **Kopec AM**, Rivera PD, Lacagnina MJ, Hanamsagar R, Bilbo SD. (2017). Optimized solubilization of TRIzol-precipitated protein permits Western blotting analysis to maximize data available from brain tissue. *Journal of Neuroscience Methods*, 280: 64-76.

3. Mirisis AA*‡, Alexandrescu A*, Carew TJ, **Kopec AM**. (2016). The contribution of spatial and temporal molecular networks in the induction of long-term memory and its underlying synaptic plasticity. *AIMS Neuroscience*, 3(3): 356-84.

4. Stough S*, **Kopec AM***, Carew TJ. (2015). Synaptic generation of an intracellular retrograde signal requires activation of the tyrosine kinase and mitogen-activated protein kinase signaling cascades in *Aplysia*. *Neurobiology of Learning and Memory*, 125: 47-54.

5. **Kopec AM**, Philips GT, Carew TJ. (2015). Distinct growth factor families are recruited in unique spatiotemporal domains during long-term memory formation in *Aplysia californica*. *Neuron*, 86(5): 1228-39.

6. Fischbach S*, **Kopec AM*,** Carew TJ (2014). Activity-dependent inhibitory gating in molecular signaling cascades induces a novel form of intermediate-term synaptic facilitation in *Aplysia californica*. *Learning and Memory*, 21(4): 199-204.

7. Pu L, **Kopec AM**, Boyle HD, Carew TJ (2014). A novel cysteine-rich neurotrophic factor in *Aplysia* facilitates neuronal growth, MAPK activation, and long-term synaptic facilitation in identified sensory neurons. *Learning and Memory*, 21(4): 215-222.

8. **Kopec AM** & Carew TJ (2013). Growth factor signaling and memory formation: Temporal and spatial integration of a molecular network. *Learning & Memory*, 20(10): 531-539.

9. Philips GT, **Kopec AM**, Carew TJ (2013). Pattern and predictability in memory formation: From molecular mechanisms to clinical relevance. *Neurobiology of Learning and Memory*, 105: 117-124.

10. Philips GT, Ye X, **Kopec AM**, Carew TJ (2013). MAPK establishes a molecular context that defines effective training patterns for long-term memory formation. *The Journal of Neuroscience*, 33(17): 7565-73.

ACADEMIC PRESENTATIONS

Invited Talks

Oct. 2017 Lurie Center for Autism Mentorship meeting; Massachusetts General Hospital
Title: “Adolescent development of the reward circuitry: A window of opportunity for Autism prognosis?”

June 2017 Lurie Center for Autism Leadership Council meeting; Massachusetts General Hospital
Title: “The contribution of immune signaling to the development of sex-specific adolescent social behavior”

Jan. 2017 Addiction Grand Rounds; Massachusetts General Hospital
Title: “Neuroimmune signaling underlies a critical period of vulnerability to drugs of abuse in adolescence”

April 2015 Brain and Behavior course (CORE-UA 306) Guest Lecture; New York University
Title: “Neural Mechanisms of Memory Formation”

Sept. 2014 Neuroscience Open House; New York University
Title: “Spatiotemporal Coordination of Growth Factor Signaling during Long-Term Memory Formation”

May 2014 Neurobiology Supergroup; New York University
Title: “Spatiotemporal Coordination of Growth Factor Signaling during Long-Term Memory Formation”

April 2014 Brain and Behavior course (CORE-UA 306) Guest Lecture; New York University
Title: “Molecular Mechanisms of Memory Formation”

Poster Presentations

ǂ Indicates student mentee contribution

1. **Kopec AM**, Ayre NRǂ, Sweat SCǂ, Bilbo SD (accepted, Nov. 2017). The natural developmental relationship between microglia and dopamine D1 receptors is altered by adolescent morphine exposure in the nucleus accubmens. 16th Annual Molecular and Cellular Cognition Society. Washington, D.C.

2. **Kopec AM**, Ayre NRǂ, Sweat SCǂ, Bilbo SD (accepted, Nov. 2017). The natural developmental relationship between microglia and dopamine D1 receptors is altered by adolescent morphine exposure in the nucleus accubmens. 47th Annual Society for Neuroscience meeting. Washington, D.C.

3. **Kopec AM**, Ayre NRǂ, Sweat SCǂ, Bilbo SD (2017). Microglial elimination of dopamine D1 receptors defines sex-specific changes in nucleus accumbens development and social play behavior during adolescence. New Directions in Neurodevelopmental Disorders Symposium. Boston, MA.

4. **Kopec AM**, Ayre NRǂ, Sweat SCǂ, Bilbo SD (2017). Sex-specific complement- and microglia-dependent elimination of dopamine D1 receptors during adolescent development in the nucleus accumbens. Neuro-Immune Axis: Reciprocal Regulation in Development, Health, and Disease. Sitges, Spain.

5. **Kopec AM**, Ayre NRǂ, Sweat SCǂ, Bilbo SD (2017). The natural developmental relationship between microglia and dopamine D1 receptors is altered by adolescent morphine exposure in the nucleus accubmens. Neuroplasticity, Neuroregeneration, and Brain Repair, New York Academy of Science. New York, NY.

6. **Kopec AM**, Ayre NRǂ, Sweat SCǂ, Bilbo SD (2017). The natural developmental relationship between microglia and dopamine D1 receptors is altered by adolescent morphine exposure in the nucleus accubmens. 9th Annual MassGeneral Hospital *for* Children Research Day. Boston, MA.

7. **Kopec AM**, Sweat SCǂ, Ayre NRǂ, Bilbo SD (2016). Neuroimmune signaling in the nucleus accumbens underlying the adolescent critical period for drugs of abuse. 46th Annual Society for Neuroscience meeting. San Diego, CA.

8. **Kopec AM**, Sweat SC‡, Ayre NR‡, Bilbo SD (2016). Neuroimmune signaling in the nucleus accumbens underlying the adolescent critical period for drugs of abuse. 15th Annual Molecular and Cellular Cognition Society. San Diego, CA.

9. **Kopec AM**, Sweat SC‡, Ayre NR‡, Bilbo SD (2016). Sexually dimorphic neuroimmune signaling in the maturing nucleus accumbens. Duke University Neural-Glial Group Retreat. Chapel Hill, NC.

10. **Kopec AM**, Mirisis AA‡, Carew TJ (2015). The role of growth factor signaling in post-transcriptional RNA regulation during long-term memory formation in *Aplysia*. 45th Annual Society for Neuroscience meeting. Chicago, IL.

11. **Kopec AM**, Mirisis AA‡, Carew TJ (2015). The role of growth factor signaling in post-transcriptional RNA regulation during long-term memory formation in *Aplysia*. 14th Annual Molecular and Cellular Cognition Society. Chicago, IL.

12. Stough S, **Kopec AM**, Carew TJ (2015). Synaptic generation of a retrograde intracellular signal requires tyrosine kinase and mitogen-activated protein kinase activity in *Aplysia*. 45th Annual Society for Neuroscience meeting. Chicago, IL. *indicates co-first authorship

13. **Kopec AM**, Carew TJ (2014). Distinct growth factor families are recruited in unique spatiotemporal domains during long-term memory formation in *Aplysia*. Poster no. 561.02; 44th Annual Society for Neuroscience meeting. Washington, D.C.

14. **Kopec AM**, Philips GT, Carew TJ (2014). Distinct growth factor families are recruited in unique spatiotemporal domains during long-term memory formation in *Aplysia*. 13th Annual Molecular and Cellular Cognition Society. Washington, D.C.

15. **Kopec AM**, Carew TJ (2013). Distinct growth factor families have unique spatiotemporal profiles during the induction of Two-Trial long-term memory in *Aplysia*. Poster no. 193.13; 43rd Annual Society for Neuroscience meeting. San Diego, CA.

16. **Kopec AM**, Carew TJ (2013). Distinct growth factor families have unique spatiotemporal profiles during the induction of Two-Trial long-term memory in *Aplysia*. 12th Annual Molecular and Cellular Cognition Society. San Diego, CA.

17. **Kopec AM**, Carew TJ (2012). Growth factor signaling during long-term memory formation in *Aplysia*. Poster no. 292.16; 42nd Annual Society for Neuroscience meeting. New Orleans, LA

18. Leeman BA, **Kopec AM**, Macklin EA, Schomer DL, Meador KJ, O'Connor MG (2011). Long-term verbal memory outcomes after anterior temporal lobectomy: evidence for cognitive reserve. Poster no. PD4.007 American Academy of Neurology. Honolulu, HI.

19. **Kopec AM**, Dale CL, Simpson GV, Luks T (2009). Paying Attention When it Counts: Motivation Effects on Frontal Structures During Cognitive Control. Celebrate Carroll, Carroll University. Waukesha, WI.

MENTORED STUDENT RESEARCH

2017-present Brianna Benjamin; Next Generation Scholars Mentorship Program*
University of Virginia student, mentored through New York Academy of Science;
*general STEM mentorship program without formal research project

2017-present Ernesto Barbosa; volunteer student from Boston College
Harvard Medical School/Mass General Hospital

2017-present Austin Melody; volunteer post-baccalaureate student
Harvard Medical School/Mass General Hospital

2017 Seniha Ipekci; spring semester Neurobiology intern from Harvard College
Harvard Medical School/Mass General Hospital

2015-17 Nathan Ayre; post-baccalaureate volunteer student
Duke University and Harvard Medical School/Mass General Hospital

2015-16 Sean Sweat; Graduation with Distinction Senior Honor's Thesis student
Duke University; currently in post-baccalaureate program at NIMH

2014-15 Anastasios Mirisis; Carew lab research assistant (under Dr. Carew's advisement)
New York University; currently in M.S. Biology program at New York University

2014-15 Alex Chen; Blueprint Program for Enhancing Neuroscience Diversity through Undergraduate Research Education Experiences (BP-ENDURE, co-advisor with Dr. Gary Philips)
New York University; currently in Ph.D. program at University of Michigan

2011-12 Yolanda Gutierrez Gonzalo; Biology Master's student thesis mentor (under Dr. Carew's advisement)
New York University; currently in Ph.D. program at Centro de Biología Molecular Severo Ochoa in Spain

TEACHING AND DIDACTIC TRAINING

2012-15 Brain and Behavior (CORE-UA 306) Teaching/Lab Assistant
New York University; direct advisement of 6 total laboratory sections (~25 students/section) and co-advisement of 3 full lecture sections (~200 students/course)

2015 Communication in Teaching and Learning Excellence Certification
New York University

2014 Brain and Behavior Lab course content and manual re-design
New York University; secured funding to update and re-structure laboratory manual instruction and exercises under advisement of Dr. André Fenton

2012 Teaching and Learning Excellence Certification
New York University

2011 Neurobiology and Behavior (N110L) Lab Instructor
University of California Irvine; direct advisement of 2 laboratory sections (~30 students/section)

HONORS AND AWARDS

2017 Poster Presentation Travel Grant
New York Academy of Sciences; Total Funding: $725

2016 Center for Neural Science Nominee for Dean's Outstanding Dissertation Award
New York University

2014 Dean's Student Travel Grant
New York University; Total Funding: $500

2013 Nominee for Joint Center for Neural Science-School of Medicine Integrative Neuroscience Training Program in Learning, Memory, Development and Plasticity
New York University; withdrew due to NRSA award

2009 Joseph E. Runkel Honor's Award in Psychology
Carroll University; first award given in 10+ years

2009 Magna Cum Laude Graduation honors
Carroll University

PROFESSIONAL SERVICE

2017-present New York Academy of Science Next Generation Scholars Mentor

2012-present New York Academy of Science member

2012-present Molecular and Cellular Cognition Society member

2010-present Society for Neuroscience member

2016 Neural-Glial Group Retreat Scientific Committee; Duke University

2013 BioBus volunteer teacher

Ad hoc review Journal of Autism and Developmental Disorders; PLOS One; Brain, Behavior, and Immunity (assisted); Cell (assisted); Journal of Neuroscience (assisted); Learning and Memory (assisted); Neurobiology of Learning and Memory (assisted); Psychopharmacology (assisted)