Adam Carte, PhD

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Education

Harvard University – Cambridge, MA, USA

Systems, Synthetic, and Quantitative Biology Ph.D. Program — August 2014 – May 2022
Alexander Schier Lab, Department of Molecular and Cellular Biology
Thesis: Propagation and Interpretation of Nodal Signaling

Biozentrum, University of Basel – Basel, Switzerland

Visiting PhD Student (Gastdoktorand) — January 2020 – May 2022
Alexander Schier Lab, Biozentrum

West Virginia University – Morgantown, WV, USA

Biochemistry B.S. and biology minor — August 2010 – May 2014
summa cum laude

Publications

- Liu, J., Castillo-Hair, S.M., Du, L.Y., Wang, Y., **Carte, A.N.**, Colomer-Rosell, M., Yin, C., Seelig, G., and Schier, A.F. Dissecting the regulatory logic of specification and differentiation during vertebrate embryogenesis. bioRxiv [preprint]. 2024. doi: https://doi.org/10.1101/2024.08.27.609971

- Dingal, P.C.D.P., **Carte, A.N.***, Montague, T.G.*, Suan Jr., M.B.L., and Schier, A.F. Molecular mechanisms controlling the biogenesis of the TGF-β signal Vg1. *PNAS*. 2023; 120 (43) e2307203120 *These authors contributed equally

- Lee, M., Betz, C., Rin, J., Paatero, I., Schellinx, N., **Carte, A.N.**, Wilson, C.W., Ye, W., Affolter, M., and Belting, H.G. Control of dynamic cell behaviors during angiogenesis and anastomosis by Rasip1. *Development*. 2021; 148(15): dev197509

- Lord, N.D.*, **Carte, A.C*.**, Abitua, P.B., and Schier, A.F. The pattern of Nodal morphogen signaling is shaped by co-receptor expression. *eLife*. 2021;10(e54894): 10.7554/eLife.54894 *These authors contributed equally

- Delaurier, A., Howe, D.G., Ruzicka, L., **Carte, A.N.**, Hernandez, L.M., Wiggins, K.J., Gallati, M.M., Vanpelt, K., Rosado, F.L., Pugh, K.G., Shabdue, C.J., Jihad, K., Thyme, S.B., and Talbot, J.C. ZebraShare: a new venue for rapid dissemination of zebrafish mutant data. *PeerJ*. 2021; 9(e11007): 10.7717/peerj.11007
  top 5 most-viewed PeerJ "developmental biology" article of 2021

- Raj, B., Farrell, J.A., Liu, J., El Kholtei, J., **Carte, A.N.**, Navajas Acedo, J., Du, L.Y., McKenna, A., Relić, D., Leslie, J.M., and Schier, A.F. Emergence of neuronal diversity during vertebrate brain development. *Neuron*. 2020; 108(6):1058-1074.e6

Grant and Fellowship Awards

- 2023 **NIH Research Supplement to Promote Diversity in Health-Related Research 3R01AI170835-02S1. $398,615 over 3 years.** Terminated by NIH prematurely April 2025.
- 2019 Harvard Center for Biological Imaging Simmons Award - $2500
- 2018 Harvard Center for Biological Imaging Simmons Award - $2500
- 2017 Harvard Center for Biological Imaging Simmons Award - $2300
- 2016 Harvard Center for Biological Imaging Simmons Award - $2500
- 2015 **National Science Foundation Graduate Research Fellowship Awardee. $138,000 over 3 years.**
- 2013 NASA West Virginia Space Grant Consortium Undergraduate Research Fellowship- $5000

Presentations and Posters

- "A model organism approach to understanding the cellular, molecular, and genetic mechanisms of endosymbiosis," HMS Department of Genetics Trainee Seminar. Harvard Medical School, Boston, MA, March 2026. Invited internal seminar presentation.

- "Leveraging *Drosophila melanogaster* and *Sodalis praecaptivus* to uncover the cellular, molecular, and genetic mechanisms of host-beneficial endosymbioses," 9th Annual Boston Area Drosophila Meeting. University of Massachusetts Boston, Boston, MA. June 2025. Seminar presentation selected from abstracts.

- "Leveraging *Drosophila melanogaster* and *Sodalis praecaptivus* to uncover the cellular, molecular, and genetic Mechanisms of host-beneficial endosymbioses," Boston Bacterial Meeting. Harvard University, Cambridge, MA. June 2025. Poster presentation.

- "Leveraging *Drosophila melanogaster* and *Sodalis praecaptivus* to uncover the cellular, molecular, and genetic mechanisms of host-beneficial endosymbioses," NSF BII for Mechanisms of Cellular Evolution Annual Symposium. Arizona State University, Tempe, AZ, November 2024. Seminar presentation selected from abstracts.

- "The Nodal signaling gradient is shaped by a co-receptor," Long-distance Cell-Cell Signaling in Development and Disease, Exeter, United Kingdom, April 2022. Seminar presentation selected from abstracts. Virtual presentation due to COVID. **Travel award** (unused).

- "The unappreciated role of a co-receptor in shaping early embryonic tissue patterning," Developmental Biology New York – the 3rd annual free undergraduate-focused developmental biology conference, Virtual Conference, November 2021. **Invited keynote speaker**.

- "The Nodal signaling gradient is shaped by a co-receptor," 8th Tri-Regional Developmental Biology and Stem Cell Meeting, Virtual Conference, October 2021. Seminar presentation selected from abstracts.

- "The Nodal signaling gradient is shaped by a co-receptor," The Society for Developmental Biology 80th Annual Meeting, Virtual Conference, July 2021. Poster presentation. **Best student poster competition semi-finalist**.

- "The Nodal signaling gradient is shaped by a co-receptor," 13th Annual Swiss Zebrafish Society Meeting, Virtual Conference, April 2021. Seminar presentation selected from abstracts. **1st place best presentation**.

- "Co-receptor expression shapes the Nodal signaling gradient," Biozentrum Symposium, Basel, Switzerland, January 2020. Invited internal seminar presentation.

- "Co-receptor expression shapes the Nodal signaling gradient," HMS Department of Systems Biology Trainee Seminar, Harvard Medical School, Boston, MA, October 2019. Invited internal seminar presentation.

- "Co-receptor feedback shapes the Nodal signaling gradient," Developmental and Regenerative Biology Program Faculty/Student Seminar Series, Harvard Medical School, Boston, MA, September 2019. Invited internal seminar presentation.

- "Feedback regulation of Nodal signaling by its co-receptor," Northeast Regional Meeting of the Society for Developmental Biology, Woods Hole Marine Biological Laboratories, Woods Hole, MA, April 2019. Seminar presentation selected from abstracts. **2nd place best trainee talk**.

- "Spatial Propagation of Nodal Signaling," EMBO Cell and Developmental Systems Workshop, Arolla, Switzerland, August 2018. Poster presentation. **Travel award**.

- "Spatial Propagation of Nodal Signaling," Northeast Regional Meeting of the Society for Developmental Biology, Woods Hole Marine Biological Laboratories, Woods Hole, MA, April 2018. Poster presentation.

- "A Targeted RNAi Screen of Maternally Deposited Cofactors in the Drosophila Embryo." 55th Annual Drosophila Research Conference, San Diego, CA, March 2014. Poster presentation.

- "Computational Analysis of Lysine 120 Conservation in Protein Kinase CK2α," 14th annual Ronald E. McNair Conference for McNair Scholars and Undergraduate Research at the University of Maryland, College Park, MD, March 2013. Seminar presentation.

Honors and Awards

- 2022 Harvard Medical School PhD Hooding Ceremony Student Speaker
- 2021 1st place best presentation at the 13th Annual Swiss Zebrafish Society Meeting
- 2019 Outstanding Veteran Teaching Fellow Award, Massachusetts Amgen Biotech Experience Program
- 2019 Second place best trainee talk at the Northeast Regional Meeting of the Society for Developmental Biology
- 2016 Harvard Certificate of Distinction in Teaching – fall semester
- 2016-2019 Harvard Center for Biological Imaging Simmons Award (Competitive grant award offered to Harvard graduate students to conduct advanced microscopy at the Harvard Center for Biological Imaging)
- 2016 National ComSciCon participant (only 50 of >800 applicants chosen for this 3-day science communication workshop)
- 2015 National Science Foundation Graduate Research Fellow
- 2014 West Virginia University Biochemistry Summa Cum Laude Graduate
- 2014 University Honors Scholar Graduate
- 2014 Biology Departmental Honors Graduate
- 2014 Gamma Sigma Delta, the National Honor Society of Agriculture, inductee
- 2010-2014 President's List (6 consecutive semesters)
- 2014 Dean's List (spring semester)
- 2013 Goldwater Scholarship Honorable Mention
- 2012 West Virginia University McNair Scholar (preparation of underrepresented undergraduate students for doctoral studies through involvement in research)
- 2011 Barry Kiger Memorial Scholarship (merit and need-based scholarship for WVU students)
- 2010 Dean's List (fall semester)
- 2010 West Virginia Promise Scholar
- 2010 Bright Foundation Scholar (private scholarship)
- 2010 Robert C. Byrd Honors Scholar
- 2010 West Virginia University Presidential Honors Scholarship
- 2010 Wunschel Memorial Presidential Scholarship
- 2010 American Chemical Society, Kanawha Valley Chapter, Chemical Science Scholarship
- 2010 Valedictorian of Nicholas County High School (ranked 1 out of 188)

Leadership Skills and Service

- 2026 Selected for and completed HMS/Hfp Consulting Postdoc Leadership and Management Skills Course
- 2023 Completed 3-part "Building your Mentorship Toolkit" workshop and produced mentoring statement
- 2019 Harvard College Undergraduate Research Association graduate student mentor
- 2019 National Collegiate Research Conference invited panelist "Choosing Graduate School"
- 2019 Invited panelist "Choosing Mentors and Mentoring Up", Harvard Medical School Program in Graduate Education
- 2019 National Collegiate Research Conference poster session judge
- 2018 Harvard College Undergraduate Research Association graduate student mentor
- 2018 National Collegiate Research Conference poster session judge
- 2017-2018 Harvard GSAS Science Policy Group executive board
- 2017 Harvard College Undergraduate Research Association graduate student mentor
- 2017 National Collegiate Research Conference poster session judge

- 2015 Symposium on the Future of Research organizing committee
- 2015 Harvard Science in the News Spring Lecture Series Co-Executive Director
- 2013 WVU Student Body Governor
- 2013 President and founder of the WVU Association of Undergraduate Researchers

Research Experience

Postdoc, Perrimon Lab, Harvard Medical School, Dept. of Genetics October 2022 – present
Combining high-throughput, cell-based genetic screening with infection biology in *Drosophila melanogaster* to learn about the establishment, maintenance, and evolution of host-beneficial endosymbioses in a jointly advised collaboration with Dr. John McCutcheon at Arizona State University.

Postdoc, Schier Lab, University of Basel, Biozentrum June 2022 – September 2022
Short postdoc in the lab of Dr. Alexander Schier to continue several projects begun during my PhD.

PhD Thesis Research Fall 2015 – May 2022
Working in the lab of Dr. Alexander Schier first in the Department of Cellular and Molecular Biology at Harvard University and then at the University of Basel's Biozentrum, I integrated developmental biology techniques with approaches from systems biology to gain a more complete and quantitative understanding of how the Nodal signaling pathway functions in early zebrafish embryogenesis.

Harvard University FAS Center for Systems Biology Internship June 2013 – August 2013
Immersive 10-week research experience working in the DePace lab at Harvard Medical School. Skills in fruit fly genetics, microscopy, and data analysis were all learned in-depth while working on "A Targeted RNAi Screen of Maternally Deposited Cofactors in the Drosophila Embryo".

WVU Biology 486 Honors Investigation and Thesis August 2012 – May 2014
Application of computational biology and bioinformatics techniques as well as acquired knowledge in conduction of biochemical and genetic assays while spending three semesters working on "Computational Analysis of CK2 Targets in Drosophila-Molecular/Genetic Studies" under the guidance of Dr. Ashok Bidwai.

WVU McNair Scholars Program May 2012 – May 2013
Extensive training in computational biology and bioinformatics techniques while working on "Computational Analysis of Lysine 120 Conservation in Protein Kinase CK2α" under the guidance of faculty mentor and full professor Dr. Ashok Bidwai.

Teaching, Outreach, and Mentorship Experience

Harvard Systems Biology Secondary Summer Internship Mentor June 2024 – August 2024
Non-research advisor to one summer undergraduate intern, with weekly in-person check-in meetings.
- External advising on scientific experience
- Final seminar presentation preparation assistance
- Career trajectory planning – drafting of 1-year and 5-year action plans

HMS Dept. of Genetics Triads Program Mentor November 2023-May 2024
Monthly meetings with one senior and one junior PhD student to provide mentorship, support, and community.
- Formal avenues for training in mentorship, including a 3-session "Building your Mentorship Toolkit" series of workshops and a workshop on "Navigating Difficult Conversations".

University of Basel Biozentrum Teaching Assistant February 2022
Teaching assistant position for the first-year PhD student course "How to be a Scientist".
- Coached a small group of students on 1. How to present a paper at journal clubs and 2. How to write a research proposal
- Used active learning techniques to workshop each student's presentations and proposals

- Served as a panelist for a course-wide discussion on what to expect while working as a PhD student

Harvard Life Sciences Outreach Teaching Fellow August 2015 – August 2019
Multiple experiences with the Harvard Life Sciences Outreach Program (LSO)/Amgen Biotech Experience (ABE) Spring Laboratory Program.

- Used zebrafish as a teaching tool for both high school instructors and students ranging from elementary school to high school, including experiences for students who are deaf and hard of hearing or have autism spectrum disorder
- Used molecular biology techniques like PCR, restriction enzyme digests, and gel electrophoresis to teach high school students about genetics and genetically modified organisms
- **2019 Outstanding Veteran Teaching Fellow Award**

Harvard University Teaching Fellow August 2016 – Dec 2016
Paid teaching position for Molecular and Cellular Biology 60.

- Responsible for running a laboratory section, holding weekly office hours, conducting review sessions, attending and assisting with lectures, and grading
- Independently managed sixteen undergraduate students and guided them through exploratory, immersive research into the role of uncharacterized genes in the DNA damage response
- Conducted own experiments and presented results to the entire class of >140 students upon the conclusion of the course
- Learned a multitude of cell biological topics in-depth and significantly improved skills in teaching, science communication, and public speaking
- Awarded **Certificate of Distinction in Teaching** from Harvard University's Bok Center in recognition of the positive evaluations received from my students

Harvard Systems Biology Summer Internship Secondary Mentor June 2016 – August 2016
Non-research advisor to 4 undergraduate summer interns.

- Oriented the students to both Boston and Harvard
- Advised poster preparation and presentation
- Guided students on preparing for graduate school or other post-baccalaureate options

Harvard Life Sciences Outreach Zebrafish Course Teaching Fellow April 2016
Paid teaching position for three-day courses utilizing zebrafish to explain the genetics of development and the importance of model organisms to high school students.

WVU Davis College Teaching Assistant August 2013 – December 2013
Teaching assistant for "Introduction to Animal Sciences", a freshman-level course for students entering the Animal Sciences bachelor's program in WVU's Davis College. Responsibilities included grading, course content development, and final project mentorship.

Professional Affiliations

- Genetics Society of America (GSA), 2013 – 2015; 2023 – present
- Society for Developmental Biology (SDB), 2016 – 2023