

Ariel M. Pani

University of North Carolina at Chapel Hill
Biology Department
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Education

The University of Chicago

Ph.D., Evolutionary Biology

2013

Cornell University

BA *summa cum laude*, College Scholar in Organismal Biology

2004

Research Experience

University of North Carolina at Chapel Hill,

Biology Department and Lineberger Comprehensive Cancer Center

Chapel Hill, NC

2013 – present

Postdoctoral fellow with Bob Goldstein

- Investigate mechanisms of signaling molecule dispersal *in vivo* and how cell architectures and behaviors regulate cell-cell signaling
- Discovered that free, extracellular dispersal can generate a long-range Wnt gradient *in vivo* and is essential for signaling

Stanford University

Hopkins Marine Station and Biology Department

Pacific Grove, CA

2010 – 2013

Graduate student with Christopher Lowe

- Utilized hemichordates as a system to investigate developmental genetic bases of body plan evolution, focusing on vertebrate nervous system evolution and ectodermal patterning
- Discovered that three vertebrate brain signaling centers have unexpectedly ancient origins

The University of Chicago

Committee on Evolutionary Biology

Chicago, IL

2007 – 2010

Graduate student with Christopher Lowe

- Began graduate training at The University of Chicago before Lowe lab relocated to Stanford University

The University of Louisville

Department of Biochemistry and Molecular Biology

Louisville, KY

2004 – 2007

Research technician with Ronald Gregg

- Designed and performed projects characterizing genotype-phenotype relationships in Williams syndrome and other neurodevelopmental disorders in collaboration with psychologists and physicians

Cornell University

Department of Ecology and Evolutionary Biology

Ithaca, NY

2003 – 2004

Undergraduate researcher with David Winkler

- Showed that non-heritable variation in flight ability predicts reproductive success in tree swallows

Honors and Awards

Postdoctoral Fellowship Award

American Cancer Society

2016 – 2018

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| Ruth L. Kirschstein Postdoctoral National Research Service Award National Institute of General Medical Sciences | 2015 –2016 |
| Integrated Training in Cancer Model Systems Postdoctoral Fellowship University of North Carolina Lineberger Comprehensive Cancer Center | 2013 – 2015 |
| Earl H. and Ethel M. Myers Oceanographic and Marine Biology Trust Award | 2012 |
| Ruth L. Kirschstein Predoctoral National Research Service Award National Institute of Neurological Disorders and Stroke | 2011 – 2013 |
| Frank R. Lillie Fellowship Marine Biological Laboratory | 2009 |
| Hinds Fund Research Award The University of Chicago | 2009 |
| Hughes Summer Research Award Cornell University | 2003 |
| College Scholar Cornell University | 2001 – 2004 |

Publications

Pani AM, Goldstein B (2018) Direct visualization of a native Wnt *in vivo* reveals that a long-range Wnt gradient forms by extracellular dispersal. *eLife* 7:e38325 DOI: 10.7554/eLife.38325 (recommended by F1000)

Heppert JK, **Pani AM**, Roberts AM, Dickinson DJ, Goldstein B (2018) A CRISPR tagging-based screen reveals localized players in Wnt-directed asymmetric cell division. *Genetics* 208: 1147-1164 (cover article)

Darras S, Fritzenwanker J, Uhlinger K, Farrelly E, **Pani AM**, Hurley I, Norris R, Osowitz M, Terasaki M, Wu M, Aronowicz J, Kirschner M, Gerhart J, Lowe CJ (2018) Anteroposterior patterning by early canonical Wnt signaling during hemichordate development. *PLoS Biol* 16: e2003698

Naegeli KM, Hastie E, Garde A, Wang Z, Keeley DP, Gordon KL, **Pani AM**, Kelley LC, Morrissey M, Chi Q, Goldstein B, Sherwood DR (2017) Cell invasion *in vivo* via rapid exocytosis of a transient lysosome-derived membrane domain. *Dev Cell* 43: 403-417

Highlighted by – Wang S, Yamada KM (2017) Localized lysosome exocytosis helps breach tissue barriers. *Dev Cell* 43: 377-378

Linden LM, Gordon KL, **Pani AM**, Payne SG, Garde A, Burkholder D, Chi Q, Goldstein B, Sherwood DR (2017) Identification of regulators of germ stem cell enwrapment by its niche in *C. elegans*. *Dev Biol* 429: 271-284.

Heppert JK, Dickinson DJ, **Pani AM**, Higgins CD, Steward A, Ahringer J, Kuhn JR, Goldstein B (2016) Comparative assessment of fluorescent proteins for *in vivo* imaging in an animal model system. *Mol Biol Cell* 27: 3385-3394.

Marston DJ*, Higgins CD*, Peters KA, Cupp TD, Dickinson DJ, **Pani AM**, Moore RP, Cox AH, Kiehart DP, Goldstein B (2016) MRCK-1 drives apical constriction in *C. elegans* by linking developmental patterning to force generation. *Curr Biol* 26: 2079-2089.

Yao Y, Minor PJ, Zhao YT, Jeong Y, **Pani AM**, King AN, Symmons O, Gan L, Cardoso WV, Spitz F, Lowe CJ, Epstein DJ (2016) Cis-regulatory architecture of a brain signaling center predates the origin of chordates. *Nat Genet* 48: 575-580.

Simakov O, Kawashima T, Marletaz F, Jenkins J, Koyanagi R, et. al. **23** of 52 authors (2015) Hemichordate genomes and deuterostome origins. *Nature*, 527: 459-465.

Highlighted by – Dunn CW (2015) Genomics: Acorn worms in a nutshell. *Nature* 527: 448-449

Dickinson DJ, **Pani AM**, Heppert J, Higgins CD, Goldstein B (2015) Streamlined genome engineering with a self-excising drug selection cassette. *Genetics* 200: 1035-1049. (more than 500 Addgene plasmid requests)

Pani AM, Mullarkey E*, Aronowicz J*, Assimacopoulos S, Grove EA, Lowe CJ (2012) Ancient deuterostome origins of vertebrate brain signalling centres. *Nature* 483: 289-294. (Recommended by F1000)

Highlighted by – Gee H (2012) Developmental biology: a brainy background. *Nature* 483: 280.

Lowe CJ, **Pani AM** (2011) Animal evolution: a soap opera of unremarkable worms. *Curr Biol* 21: 151-153

Sobreira TJP, Marlétaz F, Simões-Costa M, Schechtman D, Pereira AC, Brunet F, Sweeney S, **Pani A**, Aronowicz J, Lowe CJ, Davidson B, Laudet V, Bronner M, de Oliveira PSL, Schubert M, Xavier-Neto J (2010) Structural shifts of aldehyde dehydrogenase enzymes were instrumental for the early evolution of retinoid-dependent axial patterning in metazoans. *Proc Natl Acad Sci USA* 108: 226-231.

Pani AM, Hobart HH, Morris CA, Mervis CB, Bray-Ward P, Kimberley KW, Rios CM, Clark RC, Gulbronson MD, Gowans GC, Gregg RG (2010) Genome rearrangements detected by SNP microarrays in individuals with intellectual disability referred with possible Williams syndrome. *PLoS One* 5: e12349.

Morris CA, **Pani AM**, Mervis CB, Rios CM, Kistler DJ, Gregg RG. (2010) Alpha-1-Antitrypsin deficiency alleles are associated with joint dislocation and scoliosis in Williams syndrome. *Am J Med Genet Part C Semin Med Genet* 154C: 299-306.

Hobart HH, Morris CA, Mervis CB, **Pani AM**, Kistler DJ, Rios CM, Kimberley KW, Gregg RG, Bray-Ward P (2010) Inversion of the Williams syndrome region is a common polymorphism found more frequently in parents of children with Williams syndrome. *Am J Med Genet Part C Semin Med Genet* 154C: 220-228.

Marshall C*, Young E*, **Pani AM**, Morris C, Freckmann M-L, Lacassie Y, Howard C, Fitzgerald KK, Peippo M, Morris CA, Shane K, Priolo M, Morimoto M, Kondo I, Manquoqlu E, Berker-Karauzum S, Edery P, Hobart HH, Mervis CB, Zuffardi O, Reymond A, Kaplan P, Tassabehji M, Gregg RG, Scherer SW, Osborne LR. (2008) Infantile spasms is associated with deletion of the MAGI2 gene on chromosome 7q11.23-q21.11. *Am J Hum Genet*, 83: 106-111.

* equal contributions

Bibliography with links at NCBI MyBibliography

<https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/43493570/?sort=date&direction=descending>

Conference Presentations

Pani AM, Goldstein B (Upcoming, 2018, December) Direct visualization of a native Wnt *in vivo* reveals that a long-range Wnt gradient forms by free, extracellular dispersal. *Minisymposium oral presentation*, ASCB | EMBO Annual Meeting, San Diego, CA.

Pani AM, Goldstein B (2018, August) Direct visualization of a native Wnt *in vivo* reveals that a long-range Wnt gradient forms by free, extracellular dispersal. *Oral presentation*, Santa Cruz Developmental Biology Meeting, Santa Cruz, CA.

Pani AM, Goldstein B (2018, July) Direct visualization of a native Wnt *in vivo* reveals that a long-range Wnt gradient forms by free, extracellular dispersal. *Poster presentation*, Society for Developmental Biology Annual Meeting, Portland, OR.

Pani AM, Goldstein B (2018, June) Direct visualization of a native Wnt *in vivo* reveals that a long-range Wnt gradient forms by free, extracellular dispersal. *Oral presentation*, Gordon Research Conference on Cell Polarity Signaling, Mount Snow, VT.

Pani AM, Heppert JK, Goldstein B (2017, June) Investigating Wnt movement and gradient formation using live imaging of a natively tagged Wnt. *Poster presentation*, Gordon Research Conference on Developmental Biology, Mount Holyoke College, MA.

Pani AM, Heppert JK, Goldstein B (2016, August) Investigating mechanisms for Wnt movement and gradient formation using live imaging of an endogenous Wnt. *Poster presentation*, Santa Cruz Developmental Biology Meeting, Santa Cruz, CA.

Pani AM, Mullarkey E, Aronowicz J, Assimacopoulos S, Grove EA, Lowe CJ (2013, January) Ancient evolutionary origins of vertebrate brain signaling center genetic programs. *Poster presentation*, RIKEN Center for Developmental Biology Annual Symposium, Kobe, Japan.

Pani AM, Assimacopoulos S, Mullarkey E, Aronowicz J, Grove EA, Lowe CJ (2009, July) Signaling center-like genetic programs in hemichordates and the origins of axial patterning mechanisms during vertebrate brain evolution. *Poster presentation*, Society for Developmental Biology Annual Meeting, San Francisco, CA.

Morris CA, **Pani AM**, John A, Rios C, Kimberley KW, Hobart HH, Gregg RG, Mervis CB (2007). Mechanisms of facial dysmorphogenesis in Williams syndrome: Combination of haploinsufficiency of ELN and GTF2IRD1 genes plus the epigenetic effects of age and hypotonia. *Oral presentation*, David W. Smith Workshop on Malformations and Morphogenesis, Williamsburg, VA.

Pani AM, Hobart HH, Rios CM, Kimberley KW, Mervis CB, Morris CA, Gregg RG (2007, March). Identification and precise characterization of chromosomal copy number abnormalities in individuals with undiagnosed genomic disorders or rearrangements using high-resolution SNP microarrays. *Poster presentation*, American College of Medical Genetics Annual Meeting, Nashville, TN.

Teaching experience

The University of Chicago

Biological Systems

Winter, 2010

Teaching assistant

- Led discussion sections, wrote portions of exams and weekly assignments, held office hours and exam reviews, graded assignments and exams for upper-level, undergraduate genetics and development course.

The University of Chicago
Molecular Approaches in Zoology

Winter, 2009

Teaching assistant

- Attended lectures and compiled notes, held office hours and exam review sessions, created and presented lectures for undergraduate EvoDevo course.

Service

North Carolina Technology in Education Symposium

2018

Assisted with microscopy workshop at statewide conference for public school teachers.

DIY microscope workshops for public school teachers

2016 - 2018

Assisted with workshops showing public school teachers how to build and utilize DIY \$10 microscopes for use in elementary schools. See <http://goldsteinlab.weebly.com/diymicroscopeworkshops.html>

Hopkins Marine Station Science Open Houses

2011, 2012

Discussed marine biology research, conservation, and science careers with visitors of all ages at public open houses at Hopkins Marine Station adjacent to the Monterey Bay Aquarium.

Professional Associations

Society for Developmental Biology
American Society for Cell Biology