OMB No. 0925-0001 and 0925-0002 (Rev. 10/2021 Approved Through 09/30/2024)

BIOGRAPHICAL SKETCH

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NAME: García, Dana Michelle

eRA COMMONS USER NAME (credential, e.g., agency login): DGARCIA4309

POSITION TITLE: Professor, Department of Biology, Texas State University

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| Texas A&M University, College Station | B. S. | 05/1986 | Zoology |
| University of California, Berkeley | Ph. D. | 12/1994 | Physiology |

**A. Personal Statement**

**My role in the proposed project is that of preceptor.**

**My research group uses a range of techniques to investigate questions broadly related to visual function, its evolution and development. Our NSF-funded research project carried out in collaboration with the University of Texas at Austin is currently focused on sensory compensation in blind salamanders, specifically correlating eye reduction with expression of *Pax6* and augmentation of the anterior lateral line system, comprising sensory hair cells and various support cells (Dobbins et al., inprep; Tovar et al., in prep). In this effort, students** use immunohistochemistry and confocal microscopy, immunoblotting, and image analysis software (Dragon ORS) to analyze diceCT images (acquired from the University of Texas Computerized Tomography Facility) to document changes that occur during development and compare across multiple species and developmental stages. Additionally, students are trained in RNA isolation and writing code to carry out transcriptomic analysis**.**

**A second project supported by intramural funds is oriented to extending results from analyses of myosin V genes (Nuckels et al., 2019) to understand the functional implications of changes to the ATP-binding domain of Myo5bb. For this project, students apply bioinformatics (harvesting sequences from databases), molecular techniques (RT-PCR, site directed mutagenesis, plasmid construction, gel electrophoresis), microbiological techniques (culturing cells), and the techniques associated with in situ hybridization (histological techniques, constructing probes, visualizing hybridized sections, etc.). Future work will include analysis of enzymatic activity.**

**Since joining Texas State University, I have graduated 20 M.S. students, 8 of whom have been Mexican-American. During this period, I have mentored >100 undergraduate students in research.** These students have presented research at national and regional conferences, totaling >140 student posters and 15 invited student oral presentations. Thirty-two students have co-authored peer-reviewed articles on research from my lab, 19 as undergraduates**. Six of my eleven publications since 2012 have included student co-authors that I have supervised.**

**I served** as a mentor for the NIH/NIGMS-funded Bridges to the Baccalaureate and Bridges to the Doctoral programs led by Dr. Ron Walter, and I formerly served on the Advisory Panel to the NIH Bridges Program (2006)**. I formerly led a Bridges to the Baccalaureate program (1998 – ~2002).**

I have extensive experience mentoring students and serving in administrative roles in degree and training programs as well as a plethora of efforts to increase representation of historically underrepresented minority students in STEM and faculty in research extensive institutions. I could serve as a resource as ideas for the proposed Bridges program are developed and implemented.

**On-going and recent support I would like to highlight:**

**NSF:** Collaborative Proposal: Developmental and Genetic Pathways to Phenotypic Convergence in a Radiation of Groundwater Salamanders; DEB 2032633; PI, total costs for Texas State University $368,942, 2020-2024

**NSF:** INCLUDES DDLP - ACCEYSS: Association of Collaborative Communities Equipping Youth for STEM Success; OIA 1934453; co-PI, total costs $14,999, 2019

**NSF:** INCLUDES DDLP - ACCEYSS: Association of Collaborative Communities Equipping Youth for STEM Success; OIA 1764404; co-PI, total costs $299,536, 2017-2020

**University:** Research Enhancement Program Grant. The impact of one alcoholic substitution on the ability of a protein to transport cargo; PI, $7895, 2022-2023

**B. Positions, Scientific Appointments, and Honors**

## Positions and Scientific Appointments

2015-present Adjunct Professor, Department of Chemistry and Biochemistry, Texas State University

2004-present Professor, Department of Biology, Texas State University

2001 Guest Professor, Department of Zoology, Johannes Gutenberg University/ Universität Mainz Sponsor: Jürgen Markl

1999-2004 Associate Professor, Department of Biology, Texas State University-San Marcos (formerly Southwest Texas State University)

1993-1999 Assistant Professor, Department of Biology, Southwest Texas State University

## Honors

2021 College of Science and Engineering Achievement Award for Excellence in Teaching/ College of Science and Engineering's 2021 Presidential Distinction Award for Excellence in Teaching

1996, 1997 Alpha Chi National Honor Society Favorite Professor

1996 SWT University Mentoring Program Outstanding Mentor

1991-1993 Chancellor’s Minority Fellow, University of California, Berkeley

1987-1993 Graduate Student, Department of Molecular and Cell Biology, University of California, Berkeley

1987-1990 National Science Foundation Graduate Research Fellow, University of California, Berkeley

1982-1986 National Merit Scholar, Texas A&M University

1982-1986 President’s Endowed Scholar, Texas A&M University

**C. Contributions to Science**

1. *Cell Biology: Cell Signaling and Cell Motility*

Publications that originated from my Ph.D. studies (mentor: Beth Burnside) addressed the signaling pathways involved in effecting dark-adaptive movements of pigment granules in the retinal pigment epithelium of fishes. Our work, which I carried on independently and continue to advance to this day, supported a model in which the classical, intracellular signaling molecule cyclic AMP functions as a cell to cell signal to convey the absence of light. As a PI, our work has extended to looking at the mechanisms for light-adaptation. \*Indicates student co-authors I have supervised.

* 1. García, D. M.; Burnside, B. Suppression of cAMP induced pigment granule aggregation by inhibitors of organic anion transport. Invest. Ophth. Vis. Sci. 1994, 35, 178-188.
  2. \*González, A. III; \*Crittenden, E.; García, D. M. Carbachol-induced pigment granule dispersion in RPE. BMC Neuroscience. 2004, 5, 23.
  3. \*Phatarpekar, P. V.; Durdan, S. F.; \*Copeland, C. M.; \*Crittenden, E. L.; \*Neece, J. D.; García, D. M. Molecular and pharmacological characterization of muscarinic receptors in retinal pigment epithelium. J. Neurochem. 2005, 95(5), 1504-1520.
  4. \*Keith, T. A.; \*Radhakrishnan, V.; \*Moredock, S., García, D. M. Uptake of 3H- cAMP by retinal pigment epithelium isolated from bluegill sunfish (*Lepomis macrochirus*). BMC Neuroscience. 2006, 7, 82.

1. *Cytoskeleton and motor proteins*

My interest in cell motility bleeds into the closely related topics of cytoskeleton and motor proteins. Some finding of particular interest include evidence of a role of alpha-actinin crosslinking microfilaments and intermediate filaments and the discovery of an interesting substitution in an otherwise highly conserved region of the motor domain of myosin V. The direction we are moving in these studies integrates our interests in evolution and structure/function relationships. \*Indicates student co-authors I have supervised.

* 1. Bolanos, S. H; \*Zamora, D. O.; García, D. M.; Koke, J. R. An -actinin isoform that may cross-link intermediate filaments and microfilaments. Cytobios 1998, 94, 39-61.
  2. \*Dixson, J. D.; Forstner, M. R. J.; García, D. M. Evolutionary history of the alpha-actinin gene family: a phylogenetic study. J. Mol. Evol. 2009, 56(1), 1-10.
  3. García, D. M.; Bauer, H.; Dietz, T.; Schubert, T.; Markl, J.; Schaffeld, M. Identification of keratins and analysis of their expression in carp and goldfish: comparison to the zebrafish and trout keratin catalog. J. Cell Tissue Res. 2005, 322(2), 245-256.
  4. \*Nuckels, R. J.; Nice, C. C.; García, D. M. Duplicated myosin V genes in teleosts show evolutionary rate variations among the motor and cargo binding domains. Genome Biol. Evol. 2019, 11(2), 415-430.

1. *Evolutionary Developmental Biology and Nerve Regeneration*

In the early 2000s, we focused some of our research efforts on optic nerve regeneration in part for personal reasons: a graduate student in the lab had a brother with paraplegia, and she was interested in exploring potential therapeutic avenues. Roger Sperry’s work on optic nerve regeneration in salamanders was inspirational in our approach, and this subtopic in developmental biology segued into an interest in evolutionary developmental biology using Central Texas salamanders as a model system. \*Indicates student co-authors I have supervised.

1. \*Saul, K. E.; Koke, J. R.; García, D. M. Activating transcription factor 3 (ATF3) expression in the neural retina and optic nerve of zebrafish during optic nerve regeneration. Comp. Biochem. Physiol., part A,2010*,* 155, 172-182.
2. \*Neve, L. D.; Savage, A. A.; Koke, J. R.; García, D. M. Activating transcription factor 3 and reactive astrocytes following optic nerve injury in zebrafish. Comp. Biochem. Physiol., partC,2012, 155(2), 213-218*.*
3. \*Tovar, R. U.; Cantu, V.; \*Fremaux, B.; \*Gonzalez Jr., P.; \*Spikes, A.; García, D. M. Comparative development and ocular histology between epigean and subterranean salamanders (*Eurycea*) from central Texas. PeerJ2021, 9, e11840.

*4. Reagents and Techniques*

Through the years, my lab has contributed to developing techniques and defining reagents, including commercially available antibodies, and more recently with Karen Lewis’s lab testing their applicability for use in zebrafish.

* 1. García, D. M.; Weigum, S. E.; Koke, J. R. GFAP and nuclear lamins share an epitope recognized by monoclonal antibody J1-31. Brain Res. 2003, 976(1), 9-21.
  2. Weigum, S. E.; García, D. M.; Raabe, T. R.; Christodoulides, N.; Koke, J. R. Discrete nuclear structures in actively growing neuroblastoma cells are revealed by antibodies raised against phosphorylated neurofilament proteins. BMC Neurosci. 2003, 4, 6.
  3. \*Villarreal, M. A.; Biediger, N. M.; Bonner, N. A.; Miller, J. N.; Zepeda, S. K.; \*Ricard, B. J.; García, D. M.; Lewis, K. A. Determining zebrafish epitope reactivity to commercially available antibodies. Zebrafish 2017, 14(4), 387-389.
  4. \*Ibarra, D. E.; \*Wiebe, D. E.; \*Mireles, T. M.; \*Pattillo, A.; \*Roberts, T.; \*Wood, T. S.; \*Przybylski, C.; \*Rodriguez, C. J.; García, D. M. A method for quantifying pigment position in retinal pigment epithelium. Exp. Eye Res*.* 2020, 195, 108038.

*5. Science Education, Teacher Education, Informal Education and Educational Disparities*

When I started on faculty at (then) Southwest Texas State University, I have been struck by the ill-preparedness of some of our students, and I have been fortunate to have colleagues interested in addressing some of their short-comings head-on. This activity is manifested in grant activity – teacher improvement grants, NSF INCLUDES grants and laboratory improvement grants – as well as publications:

1. Westerlund, J. F.; García, D. M.; Koke, J. R.; Taylor, T. A.; Mason, D. S. Summer scientific research for teachers: the experience and its effect. J. Science Teacher Education 2002, 13(1), 63-83.
2. Schwartz, R.; Westerlund, J.; García, D. M.; Taylor, T. The impact of full immersion scientific research experiences on teachers’ views of the nature of science. Electronic J. Sci.Ed. 2010, 14, 2.
3. Ashford-Hanserd, S.; Daniel, K. L.; García, D. M.; Idema, J. Factors that influence persistence of minority students in STEM majors at a Hispanic Serving Institution. J. Res.Tech. Careers 2020, 4(1). <https://doi.org/10.9741/2578-2118.1048>
4. Ashford-Hanserd, S.N.; Daniel, K.L.; García, D.; Lerma, Y.; Pedroso, R. Influences on historically underrepresented minority students' decisions to enroll and persist in STEM majors. *Proceedings of the Annual Meeting of NARST: A Worldwide Organization for Improving Science Teaching and Learning through Research.* 2021

## Partial List of Published Work in My Bibliography: <https://www.ncbi.nlm.nih.gov/myncbi/dana.garcia.1/bibliography/public/>