

HERDELINE ANN M. ARDOÑA

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RESEARCH INTERESTS

Bioinspired materials, adaptive materials, cardiac tissue engineering, optoelectronics, nanotechnology

PROFESSIONAL APPOINTMENTS AND EDUCATION

- 2020 –** **University of California, Irvine**
Assistant Professor, Department of Chemical and Biomolecular Engineering
Joint appointments (by courtesy): Department of Biomedical Engineering and Department of Chemistry
Member, Sue & Bill Gross Stem Cell Research Center
Member, Chemical and Materials Physics (ChAMP) Program
- 2017 – 2020** **Harvard University**
ACS Irving S. Sigal Postdoctoral Fellow, Disease Biophysics Group
- 2012 – 2017** **Johns Hopkins University**
Ph.D. Chemistry (with Certificate for Advanced Studies in Nanobiotechnology, 2016)
- University of the Philippines Diliman**
- 2011 – 2012** Instructor 5, Institute of Chemistry, College of Science
- 2007 – 2011** B.S. Chemistry, *summa cum laude*

AWARDS AND HONORS

- 12th Irving S. Sigal Postdoctoral Fellow, American Chemical Society (**2018 – 2020**):
Awarded every two years to one outstanding postdoctoral fellow pursuing research at the chemistry-biology interface
- International Student Research Fellowship, Howard Hughes Medical Institute (HHMI) (**2015 – 2017**)
- Faculty for the Future Fellowship, Schlumberger Foundation (**2014 – 2017**)
- Emmett and Elsie Buhle Fellowship Award, Johns Hopkins University (**2014**):
Annually given to one graduate student in acknowledgment of excellent academic performance
- Leticia Shahani Award for Best Undergraduate Thesis, UP Diliman (**2011**)
- Bank of the Philippine Islands-Department of Science and Technology: Science Award, Philippines (**2010**):
Annually given to 30 student researchers in the Philippines who excel in science and engineering
- Baldomero M. Olivera, Jr. and Lourdes J. Cruz Award, UP Diliman (**2010**):
Annually given to two highest ranking B.S. Chemistry seniors of the Institute of Chemistry, UP Diliman
- National Scholarship Program, Commission on Higher Education, Philippines (**2007 – 2011**)
- University Scholar, UP Diliman (**2007 – 2010**)

PUBLICATIONS

(*denotes equal contribution; †undergraduate co-authors, ‡corresponding author)

<https://www.ncbi.nlm.nih.gov/myncbi/herdeline.ardona.2/bibliography/public/>

- [26] S. Choi, K.Y. Lee, S.L. Kim, L.A. MacQueen, H. Chang, J.F. Zimmerman, Q. Jin, M.M. Peters, **H.A.M. Ardoña**, X. Liu, A.-C. Heiler, R. Gabardi, C. Richardson, W.T. Pu, A.R. Bausch, K.K. Parker, “Pre-fabricated fiber infused gel scaffolds guide cardiomyocyte alignment in 3D printed ventricles,” *submitted*.
- [25] Z.-F. Yao, Y. Kuang, **H.A.M. Ardoña**[‡], “Chemical fuel-driven assembly of π -conjugated peptides modulated by electrostatic interactions,” *submitted*.
- [24] **H.A.M. Ardoña**, J.F. Zimmerman, K. Shani, F. Eweje, S.-H. Kim, D. Bitounis, D. Parviz, E. Casalino, M. Strano, P. Demokritou, K.K. Parker, “Differential modulation of endothelial cytoplasmic projections after exposure to graphene-based nanomaterials,” *NanoImpact*, **2022**, 100401.

- [23] H. Chang,* Q. Liu,* J.F. Zimmerman,* K.Y. Lee, Q. Jin, M.M. Peters, S. Choi, S.L. Kim, **H.A.M. Ardoña**, L.A. MacQueen, C.O. Chantre, S.E. Motta, E.M. Cordoves, G.J. Touloumes, K.K. Parker, “Structure-function in helical cardiac musculature using additive textile manufacturing,” **2022**, *accepted, Science*. Available in bioRxiv: doi.org/10.1101/2021.08.18.456852
- [22] K.Y. Lee,* S.-J. Park,* D.G. Matthews, S.L. Kim, C. A. Marquez,[†] J.F. Zimmerman, **H.A.M. Ardoña**, A.G. Kleber, G.V. Lauder, K.K. Parker, “An autonomous, humanized fish based on cardiac biophysics,” *Science*, **2022**, 375, 639.
- [21] S. Lim, Y. Kuang, **H.A.M. Ardoña**[†]. “Evolution of supramolecular systems towards next-generation biosensors,” *Front. Chem.*, **2021**, 9, 723111.
- [20] M. Yadid, J.U. Lind, **H.A.M. Ardoña**, S.P. Sheehy, L.E. Dickinson, F. Eweje,[†] M.M.C. Bastings, B.D. Pope, B. O’Connor, J.R. Straubhaar, B. Budnik, A.G. Kleber and K.K. Parker, “Endothelial extracellular vesicles contain protective proteins and rescue ischemia-reperfusion-injury in a human heart-on-chip,” *Sci. Transl. Med.*, **2020**, 12, 565, eaax8005.
- [19] S. Ahn, C.O. Chantre, **H.A.M. Ardoña**, G.M. Gonzalez, P.H. Campbell, K.K. Parker, “Biomimetic and estrogenic fibers promote skin regeneration via estrogen receptor β ,” *Biomaterials*, **2020**, 255, 120149.
- [18] G.J. Touloumes,* **H.A.M. Ardoña**,* E.K. Casalino,[†] J.F. Zimmerman, C.O. Chantre, D. Bitounis, P. Demokritou and K.K. Parker, “Mapping 2D- and 3D-distributions of metal/metal oxide nanoparticles within cleared human ex vivo skin tissues,” *NanoImpact*, **2020**, 17, 100208.
- [17] B.B. O’Connor,* T. Grevesse,* J.F. Zimmerman, **H.A.M. Ardoña**, J.A. Jimenez,[†] K.K. Parker, “Human microvascular endothelial cell pairs model tissue-level blood-brain barrier function,” *Integr. Biol.*, **2020**, 12, 64.
- [16] F. Eweje,[†] **H.A.M. Ardoña**,* J.F. Zimmerman, B.B. O’Connor, S. Ahn, T. Grevesse, K.N. Rivera,[†] D. Bitounis, P. Demokritou and K.K. Parker, “Quantifying the effects of engineered nanomaterials on endothelial cell architecture and vascular barrier integrity using a cell pair model,” *Nanoscale*, **2019**, 11, 17878.
- [15] T.S. Kale,* **H.A.M. Ardoña**,* A. Ertel[†] and J.D. Tovar, “Torsional impacts of peptidic nanostructures imposed within confined quaterthiophene segments,” *Langmuir*, **2019**, 35, 2270.
- [14] S. Ahn, **H.A.M. Ardoña**, P.H. Campbell, G.M. Gonzalez, K.K. Parker, “Alfalfa nanofibers for dermal wound healing,” *ACS Appl. Mater. Interfaces*, **2019**, 11, 33535.
- [13] J.F. Zimmerman, **H.A.M. Ardoña**, G. Pyrgiotakis, J. Dong, B. Moudgil, P. Demokritou, K.K. Parker, “Scatter enhanced phase contrast microscopy for discriminating mechanisms of active nanoparticle transport in living cells,” *Nano Lett.*, **2019**, 19, 793 (cover article).
- [12] S. Ahn, **H.A.M. Ardoña**, J.U. Lind, F. Eweje,[†] S.L. Kim, G. M. Gonzalez, Q. Liu, J.F. Zimmerman, G. Pyrgiotakis, Z. Zhang, J. Beltran, B. Moudgil, P. Capinone, P. Demokritou and K.K. Parker, “Mussel-inspired 3D fiber scaffolds for heart-on-a-chip toxicity studies of engineered nanomaterials,” *Anal. Bioanal. Chem.* (invited article and front cover for *Analytical Advances in Sustainable and Safe Nanotechnology* issue), **2018**, 410, 6141.
- [11] **H.A.M. Ardoña**,* T.S. Kale,* A. Ertel[†] and J.D. Tovar, “Non-resonant and local field effects on the photophysics of oligo(*p*-phenylenevinylene) segments within peptidic nanostructures,” *Langmuir*, **2017**, 33, 7435.
- [10] **H.A.M. Ardoña**, E.R. Draper, F. Citossi, M. Wallace, L. Serpell, D.J. Adams, and J.D. Tovar, “Kinetically controlled coassembly of multichromophoric peptide hydrogelators and the impacts on energy transport,” *J. Am. Chem. Soc.* **2017**, 139, 8685.
- [9] Y. Zhou, B. Li, S. Li, **H.A.M. Ardoña**, W.L. Wilson, J.D. Tovar, C.M. Schroeder “Concentration-driven assembly and sol–gel transition of π -conjugated oligopeptides,” *ACS Cent. Sci.*, **2017**, 3, 986.
- [8] B. Li, S. Li, Y. Zhou, **H.A.M. Ardoña**, L.R. Valverde, W.L. Wilson, J.D. Tovar, C.M. Schroeder, “Non-equilibrium self-assembly of π -conjugated oligopeptides in solution,” *ACS Appl. Mater. Interfaces*, **2017**, 9, 3977.
- [7] W. Liyanage, **H.A.M. Ardoña**, H.-Q. Mao, and J.D. Tovar, “Cross-linking approaches to tune the mechanical properties of peptide π -electron hydrogels,” *Bioconjugate Chem.* (part of the *Peptide Conjugates for Biological Applications* special issue), **2017**, 28, 751.
- [6] **H.A.M. Ardoña** and J.D. Tovar, “Peptide pi-electron conjugates: organic electronics for biology?” *Bioconjugate Chem.* (cover article), **2015**, 26, 2290.
- [5] K. Besar,* **H.A.M. Ardoña**,* J.D. Tovar and H.E. Katz, “Demonstration of hole transport and voltage equilibration in self-assembled pi-conjugated peptide nanostructures using field-effect transistor architectures.” *ACS Nano*, **2015**, 9, 12401.
- [4] **H.A.M. Ardoña**, K. Besar, M. Togninalli,[†] H.E. Katz and J.D. Tovar, “Sequence-dependent mechanical, photophysical and electrical transport properties of pi-conjugated peptide hydrogelators.” *J. Mater. Chem. C* (part of a special themed collection: *Bioelectronics* and 2015 *Journal of Materials Chemistry C Hot Papers*), **2015**, 3, 6505.

- [3] **H.A.M. Ardoña** and J.D. Tovar, “Energy transfer within pi-conjugated peptide heterostructures in aqueous environments” *Chem. Sci.*, **2015**, 6, 1474.
- [2] B.D. Wall, Y. Zhou, S. Mei, **H.A.M. Ardoña**, A.L. Ferguson and J.D. Tovar, “Variation of formal hydrogen bonding networks within electronically delocalized pi-conjugated oligopeptide nanostructures” *Langmuir*, **2014**, 30, 11375.
- [1] **H.A.M. Ardoña**,[†] F.U. Paredes, I.H.J. Arellano and S.D. Arco, “Electrospun PET supported-ionic liquid-stabilized CdS catalyst for the photodegradation of Rhodamine B under visible light” *Mater. Lett.*, **2013**, 91, 96.

PATENT

- [1] J.D. Tovar, H.E. Katz, **H.A.M. Ardoña**, A.M. Sanders, K. Besar, “Energy transporting pi-conjugated peptide nanomaterials” U.S. Patent #10,316,060.

SUPPORT

- 2021– 2022 Interim COVID-19 Research Recovery Program (ICRRP), UCI Office of the Provost and Executive Vice Chancellor
- 2021– 2022 MRSEC-CCAM Seed Grant Program (Ardoña, lead PI; A.F. Yee, UCI, co-PI)
- 2021– 2023 UCI Council on Research, Computing, and Libraries (CORCL) Research Award

PRESENTATIONS

Selected Talks

- 03/2022 Department of Chemistry, Alcorn State University, Mississippi (*virtual*)
- 01/2022 Adding Enhanced Darkfield Hyperspectral Microscopy to Raman Microscopy for Nanoparticle Research, Cytoviva and Horiba Scientific Webinar (*virtual*)
- 11/2021 MORE Programs, California State University, Los Angeles (*virtual*)
- 08/2021 SPIE Meeting Optics + Photonics, Organic Photonics + Electronics Symposium, San Diego CA (*virtual*)
- 07/2021 LAMP Seminar Series, UCI Beckman Laser Institute & Medical Clinic (*virtual*)
- 04/2021 2nd Biomedical Engineering & Instrumentation Summit (*virtual*)
- 03/2021 Community Lecture Series, Stem Cell Research Center, University of California, Irvine, CA (*virtual*)
- 02/2021 Department of Chemistry and Biochemistry, Seton Hall University, South Orange, NJ (*virtual*)
- 12/2020 Department of Chemistry, University of California, Irvine, CA (*virtual*)
- 10/2020 Heart to Heart Training Club, Edwards Lifesciences Center for Advanced Cardiovascular Technology, UC Irvine, CA (*virtual*)

TEACHING

- *Instructor*, UC Irvine
 - ENGR 1A: General Chemistry for Engineers (**Winter 2022**)
 - CBE 181: Polymer Science and Engineering (**Fall 2020 and 2021**)
 - CBE 249: Soft Hybrid Biomaterials (**Winter 2021**)
- *Guest Instructor*, SEAS, Harvard University
 - BE 121: Cellular Engineering/ ES 222: Advanced Cellular Engineering (**Fall 2018 and 2019**)
- *Participant*, Teaching Institute: Theory, Practice & Navigating STEM Higher Ed, Harvard Medical School/ School of Dental Medicine and Center for Excellence in Teaching at Simmons University, Boston, MA (**August 2019**)
- *Teaching Assistant*, Department of Chemistry, Johns Hopkins University
 - 030.205: Organic Chemistry Lecture (**Fall 2013 – Spring 2014**)
 - 030.101/030.105: Introductory Chemistry Lecture/Laboratory (**Fall 2012 – Spring 2013**)
- *Instructor 5*, Institute of Chemistry, UP Diliman (**2011 – 2012**)
 - CHEM 16 and 17: General Chemistry Laboratory I and II, for Chemistry majors and non-majors
 - CHEM 31.1: Organic Chemistry Laboratory, for non-majors

RESEARCH MENTORING

- Postdoc: Ze-Fan Yao (2021 –)
- Graduate students: Sujeung Lim (2020 –); Yuyao Kuang (2021 –); Harrison Jeong (2021 –); Kiara Lacy (2021 –); Emil Lundqvist (2021 –)
- Undergraduate students: Catherine Ngo (2022 –); Thomas Wakuta (2022); Jaide Ventocilla, *UROP Fellow* (2020 – 2022); Pauline Tran, *UROP Fellow* (2020 – 2021); Vincent Lieu (2020 – 2021); Michael Lehman (2021)

SERVICE

- Peer review referee for: *Bioconjugate Chemistry*; *Biomaterials*; *NanoImpact*, *Bioelectricity*
- Co-Organizer, UCI SIRiPods, “Building Beating Hearts” (**August 2022**)
- Guest Editor, *NanoImpact*, Special Issue on “Environmental and Health Impacts of Two-Dimensional Nanomaterials” (**June 2022 –**)
- Co-Organizer, Diverse Leaders for the Future: Future Faculty Workshop (NSF Award #1642025) (**June 2022 –**)
- Panelist, Merck Outstanding Chemists of Color Symposium, ACS San Diego (**March 2022**)
- Speaker, Career Talks, Association of Filipino Scientists in America (AFSA) (**February 2022**)
- Mentor and Volunteer, Intersections Science Fellows Symposium (**September- November 2021**)
- Faculty Panelist, Dean’s Spring Dinner for UCI Society of Hispanic Professional Engineers (**June 2021**) and UCI MAES-Latinos in Science and Engineering (**May 2021**)
- Faculty Panelist, UCI FUSION Conference (Filipinos Unifying Scientist-Engineers in an Organized Network, Annual Conference) (**May 2021**)
- Speaker, Girl Up Program, Los Altos High School (**April 2021**)
- Judge, Orange County Science and Engineering Fair (**March 2021**)
- Mentor, UCI EmpowerHER Summit (**March 2021**)
- Panelist, AIChE at UCI Faculty Panel (**November 2020**)
- Panelist, DECADE PLUS Faculty Panel, UC Irvine (**November 2020**)
- Mentor, Chemistry Women Mentorship Network (ChemWMN) (**2020 –**)
- Mentor and Advisory Board Member, GradMAP Mentoring Network- Philippines (**2020 –**)
- Panelist, Tales from the Battlefield (Q&A Session for Academic Job Search), FAS Office of Postdoctoral Affairs (**June 2020**)
- Volunteer (Events & Programs Chair), Women Accelerators, Cambridge, MA (**2018 – 2020**)
- Member, Diversity, Inclusion and Belonging Committee at Harvard SEAS (**2017 – 2020**)
- Chemistry Department Representative, Graduate Representative Organization, JHU (**Spring 2017**)
- Member, Chemistry Diversity Networking and Achievement Committee (ChemDNA), JHU (**2016 – 2017**)
- Member, Roseman Lecture Series Planning Committee, Department of Chemistry, JHU (**2016**)
- Mentor, STEM Achievement in Baltimore Elementary Schools (NSF Award #1237992), JHU (**2015 – 2017**)
- Mentor, Women in Science and Engineering (WISE), JHU (**2015 – 2016**)
- Mentor, Thread Inc. (previously Incentive Mentoring Program), Baltimore, MD (**2012 – 2017**)