Jonathan D. Caranto

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# Education

# 2013Ph.D., Chemistry, University of Texas at San Antonio, San Antonio, TX Dissertation: The nitric oxide reductase mechanism of flavo-diiron proteins (Advisor: Prof. Donald Kurtz)

1. B.S., Chemistry, Illinois Institute of Technology, Chicago, IL

**2003**B.S., Molecular Biochemistry and Biophysics, Illinois Institute of Technology, Chicago, IL

**Appointments**

**2018–present** Assistant professor, Dept. of Chemistry, University of Central Florida, Orlando, FL

**2013–2017**Postdoctoral research associate, Dept. of Chemistry and Chemical Biology,Cornell University, Ithaca, NY (Advisor: Prof. Kyle Lancaster)

## Research Interests

## Mechanistic metalloenzymology of nitric oxide oxidations.

## Mechanistic metalloenzymology of biosynthesis and decomposition of nitrogenous functional groups in bacterial natural products.

## Protein engineering for use in synthetic and bioremediation applications.

* Physiological role of reactive nitrogen species.

## Biosynthesis and physiological roles of bacterial natural products.

**Awards and Fellowships**

**2025** COSOutstanding Scholarship, Creative Works, and Research (OSCAR) Award **2024** UCF Teaching Incentive Program (TIP) Award   
**2024** UCF Research Incentive Award (RIA)  
**2022** UCF Champion of Undergraduate Research Faculty Award  
**2022** UCF Department of Chemistry Service Award (awarded for installing holistic Ph.D admissions process )  
**2020** UCF nominee for ORAU Ralph E. Powe Award  
**2019** NIH Early Career Reviewer Program (Study section: Macromolecular Structure and Function A)  
**2019** UCF nominee for ORAU Ralph E. Powe Award  
**2015** NextProf Science workshop at University of Michigan (Biophysics)

## Peer-reviewed journal articles

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| ***Independent Career (\*Corresponding or co-corresponding authors)*** | |
| Pre-print | Martin, C.P.; Ma, Z; Holland, A.A.; Caldas Nogueira, M.L.; Davidson, V.L.; and Caranto, J.D.\* Roles of the tyrosine diiron ligand of a mycobacterial hemerythrin-like protein on spectroscopic and redox properties, and catalase and nitric oxide reactivities. ChemRxiv. Cambridge: Cambridge Open Engage; **2023;** *This content is a preprint and has not been peer-reviewed.* <https://doi.org/10.26434/chemrxiv-2023-k3lss> |
| 28. | Albert, T.; Kumar A.; Caranto, J.D.; Moënne-Loccoz, P.\* Vibrational analyses of the reaction of oxymyoglobin with NO using a photolabile caged NO donor at cryogenic temperatures *J. Inorg. Biochem.* **2024,***258,* 112633. |
| 27. | Strickland, K.A.; Martinez Rodriguez, B.; Holland, A.A.; Wagner, S.; Luna-Alva, M.; Graham, D.A.; Caranto. J.D.\*Activity assays of NnlA homologs suggest the natural product N-nitroglycine is degraded by diverse bacteria *Beilstein J. Org. Chem.* **2024,** *20,* 830-840.   * Invited article in Thematic Issue titled, “Young Investigators in Natural Products Chemistry, Biosynthesis, and Enzymology” in *Bielstein J. Org. Chem.* |
| 26. | Shultz-Johnson, L.R.; Chang, M.; Bisram, N.N.; Bryant, J.T.; Martin, C.P.; Rahmani, A.; Furst, J.I.; Caranto, J.D.; Banerjee, P.;\* Uribe-Romo, F.J.;\* Gamelin, D.R.;\* and Jurca, T.\* Multivariate analysis on the structure−activity parameters for 2 nano-CuOx‑catalyzed Reduction Reactions *ACS Appl. Nano Mater.* **2024,** *7,* 928-939*.* |
| *25.* | Bryant, J.T,; Logan, M.W.; Chen, X.; Djokic, M.; Cairnie, D.R.; Vazquez-Molina, D.A.; Nijamudheen, A.; Langlois, K.R.; Markley, M.J.; Pombar, G.; Holland, A.A.; Caranto, J.D.; Harper, J.K; Morris, A.J.;\* Mendoza-Cortes, J.L.;\* Jurca, T.;\* Chapman, K.;\* Uribe-Romo, F.J.\* Synergistic steric and electronic effects on the photoredox catalysis by a multivariate library of titania metal–organic frameworks. *J. Am. Chem. Soc.* **2023,** *145,* 4589–4600 *.* |
| *24.* | Nix, C.A.; Nottolini, I.; Caranto, J.D.; Gerasimova, Y.; Kolpashchikov, D.; Saitta, E.K.H.\* Championing the Involvement of Practitioners in the Biochemistry Educational Research Process: A Phenomenological View of the Early Stages of Collaborative Action Research. *Int. J. High. Educ.* **2022,** *11,* 114–139. |
| *23.* | Strickland, K.A.; Holland, A.A.; Trudeau, A.; Szlamkowicz, I.; Beazley, M.J.; Anagnostopoulos, V.A.; Graham, D.A.; Caranto. J.D.\* Reduction of a Heme Cofactor Initiates N-Nitroglycine Degradation by NnlA. *Appl. Environ. Microbiol.* **2022,** *88,*e0102322.   * Spotlight selection in *Appl. Environ. Microbiol.* **2022,** *Vol. 88.,* Issue 16. |
| *22.* | Ma, Z; Holland, A.A.; Szlamkowicz, I.; Anagnostopoulos, V.A.; Caldas Nogueira, M.L.; Caranto, J.D.;\* Davidson, V.L.\* The hemerythrin-like diiron protein from *Mycobacterium kansasii* is a nitric oxide peroxidase. *J. Biol. Chem.* **2022,** *298*, 101696*.* |
| *21.* | Martin, C.P.; Chen, M.; Martinez, M.F.; Ding, Y.;\* Caranto, J.D.\* The ferric-superoxo intermediate of the TxtE nitration pathway resists reduction, facilitating its reaction with nitric oxide. *Biochemistry* **2021,** *60,*2436–2446. |
| *20.* | Caranto, J.D.\* The emergence of nitric oxide in the biosynthesis of bacterial natural products, *Curr. Opin. Chem. Biol.* **2019**,*49*, 130–138. |
| ***Pre-Independent Career (Co-first authors underlined)*** | |
| *19.* | Transue, W.J.; Snyder, R.A.; Caranto, J.D.; Kurtz, Jr., D.M.; Solomon, E.I. Particle Swarm Fitting of Spin Hamiltonians: Magnetic Circular Dichroism of Reduced and NO-Bound Flavodiiron Protein *Inorg. Chem.* **2022,** *61*, 16520–16527. |
| *18.* | Dong, M.; Kathiresan, V.; Fenwich, M.K.; Torelli, A.T.; Zhang, Y.; Caranto, J.D.; Dzikovski, B.; Lancaster, K.M.; Freed, J.H.; Ealick, S.E.; Hoffmann, B.M.; Lin, H. Organometallic and radical intermediates reveal the reaction mechanism for the diphthamide biosynthetic radical SAM enzyme, *Science* **2018**, *359*, 1247-1250. |
| *17.* | Lancaster, K.M.; Caranto, J.D.; Majer, S.H.; Smith, M.A. Alternative bioenergy: Updates to and challenges in nitrification metalloenzymology, *Joule* **2018**, *2*, 421-441*.* |
| *16.* | Vilbert, A.C.; Caranto, J.D.; Lancaster, K.M.Influences of the heme-lysine crosslink in cytochrome P460 over redox catalysis and nitric oxide sensitivity, *Chem. Sci.* **2018**, *9*, 368-379*.* |
| 15. | Weitz, A.C; Giri, N.; Caranto, J.D.; Kurtz, D.M., Jr.; Bominaar, E.L.; Hendrich, M.P. Spectroscopy and DFT calculations of a flavo-diiron enzyme implicate new diiron site structures, *J. Am. Chem. Soc.* **2017**, *139,* 12009–12019. |
| 14. | Caranto, J.D.; Lancaster, K.M. Nitric oxide is an obligate bacterial nitrification intermediate produced by hydroxylamine oxidoreductase, *Proc. Natl. Acad. Sci. U.S.A.* **2017**, *114*, 8217–8222.  **Research highlighted:**   * Chemical and Engineering News– Kemsley, J. Nitric oxide gets a new role. *Chem Eng. News* **2017** 95 (34), 10. * Albany Times Union * The American Agriculturist * The Cornell Chronicle |
| 13. | Caranto, J.D.; Vilbert, A.C.; Lancaster, K.M. *Nitrosomonas europaea* cytochrome P460 is a direct link between nitrification and nitrous oxide emission, *Proc. Natl. Acad. Sci. U.S.A.* **2016**, *113*, 14704–14709.  **Research highlighted:**   * PNAS commentary– White, C.J.; Lehnert, N. *Proc. Natl. Acad. Sci. U.S.A.* **2016**, *113*, 14474–14476. * The Cornell Chronicle |
| 12. | Frederick, R.E.; Caranto, J.D.; Masitas, C.A.; Gebhardt, L.L.; MacGowan, C.E.; Limberger, R.J.; Kurtz, D.M., Jr. Dioxygen and nitric oxide scavenging by *Treponema denticola* flavo-diiron protein: A mechanistic paradigm for catalysis, *J. Biol. Inorg. Chem.* **2015**, *20*, 603–613. |
| 11. | Caranto, J.D.; Weitz, A.; Giri, N.; Hendrich, M.P.; Kurtz, D.M., Jr. A diferrous-dinitrosyl intermediate in the N2O-generating pathway of a deflavinated flavo-diiron protein, *Biochemistry* **2014**, *53*, 5631–5637. |
| 10. | Caranto, J.D.; Weitz, A.; Hendrich, M.P.; Kurtz, D.M., Jr. The nitric oxide reductase mechanism of flavo-diiron protein: Identification of active-site intermediates and products, *J. Am. Chem. Soc.* **2014**, *136*, 7981–7992. |
| 9. | Meininger, D.J.; Caranto, J.D.; Arman, H.D.; Tonzetich, Z.J. Studies of Iron(III) Porphyrinates Containing Silanethiolate Ligands, *Inorg. Chem.* **2013**, *52*, 12468–12476*.* |
| 8. | Kurtz, D.M., Jr.; Boice, E.; Caranto, J.D.; Frederick, R.E.; Masitas, C.A.; Miner, K.D. Iron: Non-heme protein with diiron-carboxylate active sites. In *Encyclopedia of Inorganic and Bioinorganic Chemistry*; Scott, R.A., Ed.; Wiley: New York, 2013. |
| 7. | Fang, H.; Caranto, J.D.; Mendoza, R.; Taylor A.B.; Hart, P.J.; Kurtz, D.M., Jr. Histidine ligand variants of a flavo-diiron protein: effects on structure and activities, *J. Biol. Inorg. Chem.* **2012**, *17*,1231–1239*.*   * Selected as cover art for JBIC 2013 issues. |
| 6. | Caranto, J.D.; Gebhardt, L.L.; MacGowan, C.E.; Limberger, R.J.; Kurtz, D.M., Jr. *Treponema denticola* superoxide reductase: In vivo role, in vitro reactivities and a novel [Fe(Cys)4] site, *Biochemistry* **2012**, *51*, 5601–5610. |
| 5. | Hayashi, T.; Caranto, J.D.; Matsumara, H.; Kurtz, D.M., Jr.; Moënne-Loccoz, P. Vibrational analysis of mononitrosyl complexes in hemerythrin and flavodiiron proteins: relevance to detoxifying NO reductase, *J. Am. Chem. Soc.* **2012**, *134*, 6878–6884. |
| 4. | Felhofer, J.L.; Caranto J.D.; Garcia C.D. Adsorption kinetics of catalase to thin-films of carbon nanotubes, *Langmuir* **2010**, *26,* 17178–17183. |
| 3. | Hayashi, T.; Caranto, J.D.; Wampler, D.A.; Kurtz, D.M., Jr.; Moënne-Loccoz, P. Insights into the nitric oxide reductase mechanism of flavo-diiron proteins from flavin-free enzyme, *Biochemistry* **2010**, *49*, 7040–7049. |
| 2. | Hillmann, F.; Riebe O.; Fischer R.; Mot A.; Caranto J.D.; Kurtz D.M., Jr.; Bahl, H. Reductive dioxygen scavenging by flavo-diiron proteins of *Clostridium acetobutylicum*, *FEBS Lett.* **2009**, *583*, 241–245. |
| 1. | Leone, A.K.; Chun, J.A.; Koehler, C.L.; Caranto, J.D.; King, J.K. Effect of proinflammatory cytokines tumor necrosis factor-α and interferon-γ on epithelial barrier function and matrix metalloproteinase-9 in Madin-Darby canine kidney cells, *Cell. Physiol. Biochem.* **2007**, *19*, 99–112. |

**Oral Presentations**

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| ***Invited presentations (# = pre-independent career)*** | |
| 28. | Caranto, J.D. *N*-nitroglycine biosynthesis: Towards enzymatic production of high-energy nitramines. SERDP In-Person Progress Report, Apr. 10, 2025 (Virtual due to travel restriction). |
| 27. | Caranto, J.D., Does protonation tune the reactivities of nitric oxide-derived metallointermediates? University of Alabama, Mar. 4, 2025. |
| 26. | Caranto, J.D., Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. University of Minnesota, Feb. 4, 2025. |
| 25. | Caranto, J.D. *N*-nitroglycine biosynthesis: Towards enzymatic production of high-energy nitramines. DoD Energy and Innovation Symposium, Washington, DC, Dec 3–6, 2024. |
| 24. | Caranto, J.D. Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. Southeastern ACS Regional Meeting, Atlanta, GA, Oct. 23–26, 2024. |
| 23 | Caranto, J.D. Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. 2024 Florida Annual Meeting and Exposition, Tampa, FL, May 30– Jun. 1, 2024. |
| 22. | Caranto, J.D., Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. University of Connecticut, Feb. 7, 2024. |
| 21. | Caranto, J.D., Novel nitrogen chemistries in nitric oxide (NO) detoxification, biosynthesis, and biodegradation University of Texas at San Antonio, 30 to R1 Celebration, Apr. 4, 2023. |
| 20. | Caranto, J.D., My academic journey with nitric oxide and metalloenzymes. St. Edward’s University, Nov. 4, 2022. |
| 19. | Caranto, J.D., Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. University of Georgia, Apr. 25, 2022. |
| 18. | Caranto, J.D., Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. Wake Forest University, Apr. 6, 2022. |
| 17. | Caranto, J.D., Christopher Martin, Manyun Chen, Maria Martinez, Zhongxin Ma, Victor L. Davidson, and Yousong Ding, Towards understanding why the TxtE {FeO2}8 intermediate resists reduction. Southeastern ACS Regional Meeting, Birmingham, AL, Nov. 10–13 2021. |
| 16. | Caranto, J.D. The enzymatic rise and fall of the nitramine N-nitroglycine. 2021 International Chemical Congress of Pacific Basin Societies, Honolulu, HI, Dec. 2021. (Cancelled due to Covid) |
| 15. | Caranto, J.D. The CYP homolog TxtE resists reduction of the {FeO2}8 intermediate, promoting efficient Trp nitration. ACS National Spring Meeting, San Antonio, TX Apr. 5–16, 2021. (2020 Fresenius Symposium; Virtual) |
| 14. | Caranto, J.D. A first look at the NO-dependent nitration mechanism of the CYP homolog TxtE. Joint Southwest/Southeastern ACS Regional Meeting, New Orleans, LA, Oct. 14–17, 2020. (Cancelled due to Covid) |
| 13. | Caranto, J.D. Towards elucidating N–N bond formation for N-nitroglycine biosynthesis. 94th Florida Annual  Meeting and Exposition, Tampa, FL, May 9–11, 2019. |
| 12. | Caranto, J.D. Biological N–N bond formation: From the nitrogen cycle to microbial natural products. Southeastern University, Jan. 28, 2019. |
| 11. | Caranto, J.D. Biological N–N bond formation: From the nitrogen cycle to microbial natural products. University of Central Florida Department of Physics, Dec. 12, 2018. |
| 10. | Caranto, J.D. Biological N–N bond formation: From the nitrogen cycle to microbial natural products. University of Central Florida Burnett School of Biomedical Sciences, Sep. 14, 2018. |
| 9. | Caranto, J.D. Biological N–N bond formation: From the nitrogen cycle to microbial natural products. 94th ACS Florida Annual Meeting and Exposition, Tampa, FL, May 3–5, 2018. |
| 8. | Caranto, J.D.; Vilbert, A.C; Lancaster, K.M. Revision by enzymology of bacterial ammonia oxidation. 255th ACS National Meeting, New Orleans, LA Mar. 18–22, 2018. |
| 7.# | Caranto, J.D.; Lancaster, K.M. Revision of metalloenzyme activities reveals potential agricultural sources of atmospheric pollutants. Invited talk at Chemistry and Chemical Biology Grad and Postdoc Seminar, Ithaca, NY, Feb 24, 2017. |
| 6.# | Caranto, J.D.; Lancaster, K.M. Rapid-mixing techniques for elucidating reaction mechanisms. Invited talk at Advanced Spectroscopy and Theoretical Modeling of Bioinorganic Systems Workshop and Seminar, Copenhagen, Denmark, Jun 16–19, 2014. |
| ***Contributed presentations (# = pre-independent career)*** | |
| 5. | Caranto, J.D; Jennings, S.; Martin, C.P.; Holland, A.A; Ma, Z.; Chen, M.; Davidson, V.K.; Ding, Y. Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. Florida Annual Meeting and Exposition, Tampa, FL, May 30–June 1, 2024. |
| 4.# | Caranto, J.D.; Lancaster, K.M. Revision of hydroxylamine oxidoreductase activities and bacterial ammonia oxidation pathways. Contributed talk at 254th ACS National Meeting, Washington D.C., Aug. 20-24, 2017.  **Presentation highlighted in Chemical and Engineering News:** Kemsley, J. Nitric oxide gets a new role. *Chem Eng. News* **2017**,95 (34), 10. |
| 3.# | Caranto, J.D.; Hayashi, T.; Hirotoshi, M.; Moenne-Loccoz, P.; Kurtz, D.M., Jr. Characterization of the nitric oxide reductase mechanism of flavo-diiron proteins. 2nd Penn State Bioinorganic Workshop, State College, PA, May 31–Jun 9, 2012. |
| 2.# | Caranto, J.D.; Hayashi, T.; Gupta, R.; Hendrich, M.; Moenne-Loccoz, P.; Kurtz, D.M., Jr. Characterization of the nitric oxide reductase mechanism of flavo-diiron proteins. 67th American Chemical Society Southwest Regional Meeting, Austin, TX, Nov 9–12, 2011. |
| 1.# | Kurtz D.M., Jr.; Caranto, J.D.; Hayashi, T.; Moenne-Loccoz, P. Probing the mechanism of a non-heme diiron nitric oxide reductase. 66th American Chemical Society Southwest Regional Meeting, New Orleans, LA, Nov 30–Dec 4, 2010. |

**Poster Presentations** ***(# = pre-independent career)***

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| 17. | Caranto, J.D. Towards the biosynthesis and enzymatic degradation of high-energy nitramines. DoD Environment & Energy Innovation Symposium, Washington, DC Dec 3–6, 2024. |
| 16. | Caranto, J.D. TxtE and *myco*HLP: Roles of conserved residues for nitric oxide-oxidizing metalloenzymes  Metallocofactors Gordon’s Research Conference. Easton, MA, Jun 9–14, 2024. |
| 15. | Caranto, J.D. Metalloenzyme-catalyzed oxidations of nitric oxide in biosynthesis and nitrosative stress protection. Metals in Biology Gordon’s Research Conference. Ventura, PA, Jan 22–27, 2023. |
| 14. | Caranto, J.D. Nitric oxide (NO), nitrite, and metalloenzymes in microbial natural product (NP) biosynthesis. Metals in Biology Gordon’s Research Conference. Ventura, PA, Jan 21–26, 2018. |
| 13. | Caranto, J.D. Nitric oxide (NO), nitrite, and metalloenzymes in microbial natural product (NP) biosynthesis. 2nd Penn State Bioinorganic Workshop, State College, PA, Jan 6–8, 2018. |
| 12.# | Smith, M; Caranto, J.D.; Lancaster, K.M. Recombinant expression, mutagenesis, and spectroscopic characterization of archaeal ammonia monooxygenase. 252nd ACS National Meeting and Exposition, Philadelphia, PA, Aug 21–26, 2016. |
| 11.# | Caranto, J.D.; Smith M.A.; Vilbert A.; Lancaster, K.M. Taming reactive nitrogen: Towards the enzyme mechanisms of biological nitrification. Georgian Bay International Conference on Bioinorganic Chemistry, Parry Sound, Ontario, Canada, May 19–22, 2015. |
| 10.# | Caranto, J.D.; Smith M.A.; Vilbert A.; Lancaster, K.M. Preliminary characterization of the putative active subunit of an archaeal ammonia monooxygenase. Advanced Spectroscopy and Theoretical Modeling of Bioinorganic Systems Workshop and Seminar, Copenhagen, Denmark, Jun 16–19, 2014. |
| 9.# | Caranto, J.D.; Smith M.A.; Vilbert A.; Lancaster, K.M. Preliminary characterization of the putative active subunit of an archaeal ammonia monooxygenase. 33rd Summer Symposium in Molecular Biology: Frontiers in Metallobiochemistry, University Park, PA, Jun 5–7, 2014. |
| 8.# | Caranto, J.D.; Gupta, R.; Hayashi T.; Wampler D.A.; Moenne-Loccoz P.; Hendrich, M.P.; Kurtz D.M., Jr. Characterization of the nitric oxide reductase mechanism of flavo-diiron proteins. College of Science Research Conference/SACNAS Regional Conference, San Antonio, TX, Oct 5, 2012. |
| 7.# | Caranto, J.D.; Hayashi T.; Wampler D.A.; Moenne-Loccoz P.; Kurtz D.M., Jr. Poster: Characterization of the nitric oxide reductase mechanism of flavo-diiron proteins. College of Science Research Conference/SACNAS Regional Conference, San Antonio, TX, Sep 30, 2011. |
| 6.# | Caranto, J.D.; Hayashi T.; Wampler D.A.; Moenne-Loccoz P.; Kurtz D.M., Jr. Characterization of the nitric oxide reductase mechanism of flavo-diiron proteins. 15th International Conference for Bioinorganic Chemistry, Vancouver, Canada, Aug 7–12, 2011. |
| 5.# | Caranto, J.D.; Hayashi T.; Wampler D.A.; Moenne-Loccoz P.; Kurtz D.M., Jr. Nitric oxide derived intermediates of *Thermotoga maritima* flavo-diiron protein. 29th Summer Symposium in Molecular Biology: Frontiers in Metallobiochemistry, University Park, PA, Jun 1–5, 2010. |
| 4.# | Caranto, J.D.; Hayashi T.; Wampler D.A.; Moenne-Loccoz P.; Kurtz D.M., Jr. Nitric oxide derived intermediates of *Thermotoga maritima* flavo-diiron protein. College of Science Research Conference/SACNAS Regional Conference, San Antonio, TX, May 28, 2010. |
| 3.# | Caranto, J.D.; Wampler D.A.; Kurtz D.M., Jr. Journey to the center of a protein: Removal of flavin from flavo-diiron protein to study nitric oxide-diiron adduct formation. College of Science Research  Conference/SACNAS Regional Conference, San Antonio, TX, Aug 7, 2009. |
| 2.# | Caranto, J.D.; Ramirez, G.; Wampler, D.A.; Hayashi, T.; Moenne-Loccoz, P.; Kurtz D.M., Jr. Flavo-diiron Proteins: O2 or NO reductases? Gordon Graduate Research Seminar: Bioinorganic Chemistry, Valencia, CA, Jan 29–Feb 1, 2009. |
| 1.# | Huang, V.W.; Caranto, J.D.; Kurtz, D.M., Jr. Kinetic investigation of the mechanism of superoxide reductase from *Desulfovibrio vulgaris*. American Chemical Society Southwestern Regional Meeting, Houston, TX, 2006. |

**Grants and Contracts Awarded**

***Active***

1. Funding Agency: Strategic Environmental Research and Development Program (SERDP), Department of Defense (Role: Sole PI)  
   Project Title: *N*-nitroglycine biosynthesis: Towards enzymatic production of high-energy Nitramines

Award Period: 05/31/2024 − 05/30/2025   
Award Amount: $250,000

1. Funding Agency: Army Education Outreach Program (Role: Sole PI)  
   Project Title: Army Research Office (ARO) Undergraduate Research Apprenticeship Program (URAP): Activities of homologs of NnlA, a nitramine degradation protein  
   Award Period: 05/01/2024 − 08/31/2024  
   Award Amount: $12,000
2. Funding Agency: Department of Defense, Army Research Office (Role: Sole PI)  
   Project Title: Mechanism of O2-dependent nitramine degradation by a heme enzyme  
   Award Period: 07/31/2020 − 12/31/2024 (One-year NCE granted to 2024)  
   Award Amount: $585,369
3. Funding Agency: National Institutes of Health (Role: Sole PI)  
   Project Title: Mechanisms of novel biological nitrogen chemistries  
   Award Period: 08/01/2022 − 07/31/2027  
   Award Amount: $1,823,190

***Completed***

1. Funding Agency: University of Central Florida Strategic Investment Program -Jump Start Fund ( **Role:** Co-PI)  
   Co-PI/Co-I: Andres Campiglia, Cherie Yestrebsky, Denisia Popolan-Vaida, Titel Jurca, Vasileios Anagnostopoulos, Melanie Beazley, Gang Chen, Karin Chumbimuni-Torres, Xiaohu Xia, Michael Hampton, Dmitry Kolpashchikov, Kangsang Lee.  
   Project Title: Liquid Chromatography Triple Quadrupole Mass Spectrometry (LC/MS-MS) Instrumentation Acquisition  
   Award Period: 11/01/2021 − 11/01/2022  
   Award Amount: $300,000
2. Funding Agency: Department of Defense, Army Research Office (**Role:** Sole PI)  
   Co-PI/Co-I: None  
   Project Title: Army Research Office (ARO) Undergraduate Research Apprenticeship Program (URAP): Activities of homologs of NnlA, a nitramine degradation protein  
   Award Period: 05/01/2022 − 08/31/2022  
   Award Amount: $9000

## Teaching and Mentoring

***Postdoctoral mentee (3)***

Active

**2023-present** Arun Kumar, PhD

**2023-present** Ben Rathman, PhD

Completed (current known placement in parentheses)

**2021-2023** Ashley Holland, PhD (Zoetis, Lincoln, NE).

***Graduate mentees (8)***

Active

**2018–present** Gabriel Padilla (Chemistry; Ph.D. candidate)

**2019-present** Kara Strickland (Chemistry; Ph.D. candidate)

**2022-present** Sarah Jennings (Chemistry)

**2022-present** Krystal Baez (Chemistry)

**2023-present** Brenda Martinez Rodriguez (Chemistry)

Graduated (current known placement in parentheses)

**2018–2024** Chris Martin (Chemistry; Ph.D. candidate)

**2018–2022** Regina Strelecki (M.S. Chemistry)

**2019–2020** Charles St. James (M.S. Biomedical Sciences; Client Engagement Manager at Center for Breakthrough Medicines, Ormond Beach, FL)

***Undergraduate mentees (29)***

Active

**2025-present** Elise Flinn (Chemistry; Expected graduation in 2027)

**2024-present** Donovan Dietrick (Chemistry; Expected graduation in 2025)

**2024-present** Hannah Klautky (Biotechnology; Expected graduation in 2025)

**2024-present** Andrew Casanova (Chemistry; Expected graduation in 2025)

**2023-present** Gabriel Santiago Rodriguez (Chemistry; Expected graduation in 2025)

**2023-present** Gabriel Oliveira(Chemistry; Expected graduation in 2025)

Graduated (current known placement in parentheses)

**2018** Mueez Amoo (B.S. Biomedical Sciences, and B.A. History; U. South Florida M.S. Microbiology program)

**2018–2019** Ali Younis (B.S. Chemistry; U. California-Irvine Chemistry Ph.D program)

**2018–2019** Kara Strickland (B.S. Chemistry; U. Central Florida Chemistry Ph.D program)

**2018–2019** Julissa Burgos (B.S. Biomedical Sciences; Vanderbilt U. Microbiology Ph.D program)

**2018–2019** Dylan Thibaut (B.S. Biomedical Sciences and B.A. Education; Lake Erie College of Osteopathic Medicine)

**2018–2019** Charles St. James (*Graduated:* M.S. Biomedical Sciences; Client Engagement Manager at Center for Breakthrough Medicines, Ormond Beach, FL)

**2018–2020** Maria Martinez (B.S. Chemistry; Louisiana State U. Chemistry Ph.D program)

**2018–2021** Alan Trudeau (B.S. Chemistry; Lab Coordinator at U. Colorado)

**2018–2021** Rahiim Lake (B.S. Chemistry; U. Rochester Biochemistry Ph.D Program)

**2019–2020** Jordan Ledgister (B.S. Biomedical Sciences; Lab Technician at Green Scientific Labs)

**2019–2020** Nicole Boyd (B.S. Chemistry; Lab Technicianat ENCO laboratories)

**2019** Miranda Cassidy(B.S. Chemistry)

**2020** Casey Dejournett (B.S. Chemistry; Forensic Biologist at U.S. Army Criminal Investigation Lab)

**2020–2022** Lannika Johnson(B.S. Chemistry; Gap year to prepare for medical school)

**2020–2022** Dominique Sims(B.S. Chemistry; Yale University Molecular Medicine, Pharmacology, and Physiology Ph.D Program)

**2021** Higor Silverio (B.S. Biology)

**2021–2022** Betsy Hinojosa (B.S. Chemistry; Lab Technician at Edgewell Personal Care)

**2021-2022** Lena Muench (Visiting intern from University of Heidelberg; DKFZ German Cancer Center)

**2022–2023** Brenda Martinez Rodriguez (Chemistry; UCF Chemistry PhD Program)

**2023** Michael Fabrizio (B.S. Biomedical Sciences; Biochemistry PhD Program at U. Florida)

**2022–2023** Michelle Luna-Alva (B.S. Chemistry)

**2023** Julie Dada (A.S. Biotechnology at Valencia College)

**2021–2025** Shelby Wagner (B.S. Chemistry)

***Trainee Success and productivity (co-first authors* underlined*)***

Post-doctoral Mentee co-authors (5 published):

* Albert, T.; **Kumar A.**; Caranto, J.D.; Moënne-Loccoz, P.\* Vibrational analyses of the reaction of oxymyoglobin with NO using a photolabile caged NO donor at cryogenic temperatures *J. Inorg. Biochem.* 2024, 258, 112633.
* Strickland, K.A.; Martinez Rodriguez, B.; **Holland, A.A.**; Wagner, S.; Luna-Alva, M.; Graham, D.A.; Caranto. J.D.\*Activity assays of NnlA homologs suggest the natural product *N*-nitroglycine is degraded by diverse bacteria *Beilstein J. Org. Chem.* **2024,** *20,* 830-840.
  + Bryant, J.T,; Logan, M.W.; Chen, X.; Djokic, M.; Cairnie, D.R.; Vazquez-Molina, D.A.; Nijamudheen, A.; Langlois, K.R.; Markley, M.J.; Pombar, G.; **Holland, A.A.**; Caranto, J.D.; Harper, J.K; Morris, A.J.;\* Mendoza-Cortes, J.L.;\* Jurca, T.;\* Chapman, K.;\* Uribe-Romo, F.J.\* Synergistic steric and electronic effects on the photoredox catalysis by a multivariate library of titania metal–organic frameworks. *J. Am. Chem. Soc.* **2023,** *145,* 4589–4600.
  + Strickland, K.A.; **Holland, A.A.;** Trudeau, A.; Szlamkowicz, I.; Beazley, M.J.; Anagnostopoulos, V.A.; Graham, D.A.; Caranto. J.D. Reduction of a heme cofactor initiates *N*-nitroglycine degradation by NnlA. *Appl. Environ. Microbiol.* **2022,** *88,* e0102322.
  + Ma, Z; **Holland, A.A.;** Szlamkowicz, I.; Anagnostopoulos, V.A.; Caldas Nogueira, M.L.; Caranto, J.D.; Davidson, V.L. The hemerythrin-like diiron protein from *Mycobacterium kansasii* is a nitric oxide peroxidase. *J. Biol. Chem.* **2022,** *298,* 101696.

Post-doctoral Presentations (4): Arun Kumar (2024 Penn State Bioinorganic Workshop, **poster**); Ben Rathman (2024 DoD Energy & Environment Innovation Symposium, **poster**; 2024 Florida ACS Meeting and Exposition, **poster**); Ashley Holland (2023 Metals in Biology GRC, **poster**)

Graduate Student Co-Authors (4 published):

* **Strickland, K.A.**; **Martinez Rodriguez, B.**; Holland, A.A.; Wagner, S.; Luna-Alva, M.; Graham, D.A.; Caranto. J.D.\*Activity assays of NnlA homologs suggest the natural product *N*-nitroglycine is degraded by diverse bacteria *Beilstein J. Org. Chem.* **2024,** *20,* 830-840.
  + Shultz-Johnson, L.R.; Chang, M.; Bisram, N.N.; Bryant, J.T.; **Martin, C.P.**; Rahmani, A.; Furst, J.I.; Caranto, J.D.; Banerjee, P.;\* Uribe-Romo, F.J.;\* Gamelin, D.R.;\* and Jurca, T.\* Multivariate analysis on the structure−activity parameters for 2 nano-CuOx‑catalyzed reduction reactions *ACS Appl. Nano Mater.* **2024,** *7,* 928-939
  + **Strickland, K.A.**; Holland, A.A.; Trudeau, A.; Szlamkowicz, I.; Beazley, M.J.; Anagnostopoulos, V.A.; Graham, D.A.; Caranto. J.D. Reduction of a heme cofactor initiates *N*-nitroglycine degradation by NnlA. *Appl. Environ. Microbiol.* **2022,** *88,* e0102322.
    - **Martin, C.P.**; Chen, M.; Martinez, M.F.; Ding, Y.\*; Caranto, J.D.\* The ferric-superoxo intermediate of the TxtE nitration pathway resists reduction, facilitating its reaction with nitric oxide. *Biochemistry* 2021, 60, 2436–2446.

Graduate student honors, awards, and fellowships (6):Sarah Jennings (2024 Travel Award for Penn State Bioinorganic Conference); Brenda Martinez Rodriguez(2024 Travel Award for Penn State Bioinorganic Conference, 2024 Travel Award for Bioinorganic Graduate Research Seminar Gordon’s Research Conference), Krystal Baez (2023 McKnight Fellowship); Christopher Martin (2024 Travel Award for Bioinorganic Graduate Research Seminar Gordon’s Research Conference, 2023 Chemistry Department Outstanding GTA Award).

Graduate student presentations (17):Brenda Martinez Rodriguez (2024 DoD Energy & Environment Innovation Symposium, **poster**; 2024 Penn State Bioinorganic Workshop, **poster**; 2024 Bioinorganic Graduate Research Seminar Gordon’s Research Conference, **oral**; 2023 SERMACS, **oral**); Kara Strickland(2024 Penn State Bioinorganic Workshop, **poster**; 2023 SERMACS, **oral**; 2023 Metals in Biology GRC, **poster**; 2022 SERMACS, **poster**); Sarah Jennings (2024 Penn State Bioinorganic Workshop, **oral**; 2023 SERMACS, **poster**); Christopher Martin(2024 Bioinorganic Graduate Research Seminar GRC, **oral**; 2022 SERMACS, **oral**); Gabriel Padilla (2024 DoD Energy & Environment Innovation Symposium, **poster**; 2024 Metallocofactors Bioinorganic Graduate Research Seminar Gordon’s research conference, **poster**; 2024 Metallocofactors Gordon’s research conference, **oral**; 2024 Florida Annual Meeting and Exposition, **oral**; 2022 SERMACS, **oral**).

Undergraduate student co-authors (3 publications with 6 undergraduate co-authors):

* Strickland, K.A.; **Martinez Rodriguez, B.**; Holland, A.A.; **Wagner, S.**; **Luna-Alva, M.**; Graham, D.A.; Caranto. J.D.\* Activity assays of NnlA homologs suggest the natural product *N*-nitroglycine is degraded by diverse bacteria *Beilstein J. Org. Chem.* **2024,** *20,* 830-840.
* Strickland, K.A.; Holland, A.A.; **Trudeau, A.**; Szlamkowicz, I.; Beazley, M.J.; Anagnostopoulos, V.A.; Graham, D.A.; Caranto. J.D. Reduction of a Heme Cofactor Initiates *N*-Nitroglycine Degradation by NnlA. *Appl. Environ. Microbiol.* **2022,** *88,* e0102322.
* Martin, C.P.; Chen, M.; **Martinez, M.F.**; Ding, Y.; Caranto, J.D. The ferric-superoxo intermediate of the TxtE nitration pathway resists reduction, facilitating its reaction with nitric oxide. *Biochemistry* **2021,** *60,* 2436–2446.

Undergraduate honors, awards, and fellowships (22): Gabriel Santiago Rodriguez (2025 Poster award UCF S3 Conference); Gabriel Oliveira (2025 Poster award UCF S3 Conference); Andrew Casanova (2025 Poster award UCF S3 Conference); Brenda Martinez Rodriguez (2023 Poster award UCF S3 Conference); Lannika Johnson (Honors Undergraduate Thesis, RAMP fellowship and UCF SURF); Maria Martinez (ACS Scholar Award, RAMP-T fellowship, REU at University of Tennessee at Knoxville); Julissa Burgos (McNair Fellowship and REU at MIT); Alan Trudeau (2020 virtual REU at Rutgers University, 2020 Princeton P3 program, ABRCMS 2019 Presentation Award in Biochemistry, McNair Fellowship, 2019 REU at MIT); Ali Younis (NSF GRFP, McNair Fellowship); Dylan Thibaut (Honors Undergraduate Thesis, Honors in the Major Scholarship and Amy Zeh Service-Learning Showcase John C Hitt Award).

Honors-in-the-major/ Honor undergraduate thesis mentees (2):

* Dylan Thibaut (2018–2019 Biomedical Sciences and Education): “Application and Comparison of Active Learning Implementation Methods in Biochemistry Education”
* Lannika Johnson(2020–2022Chemistry): “Investigation of Catalysis of Nitration by Cytochrome P450s”.

Undergraduate Presentations (20): Gabriel Santiago Rodriguez (2025 UCF S3, **poster**); Gabriel Oliveira (2025 UCF S3, **poster**); Hannah Klautky (2025 UCF S3, **poster**); Andrew Casanova (2025 UCF S3, **poster**); Donovan Dietrick (2025 UCF S3, **poster**); Brenda Martinez Rodriguez (2023 UCF S3 Conference, **poster**); Michelle Luna-Alva (2023 UCF S3 Conference, **poster**); Rahiim Lake (2022 SERMACS, **oral**); Lannika Johnson (UCF SURE Conference 2021, **poster**, and UCF SURE Conference 2022, **poster**); Dominique Sims (2022 ACS National Spring Conference, **poster**); Kara Strickland (2019 UCF SURE Conference, **poster**); Maria Martinez (2019 UCF SURE Conference, **poster**; 2019 ABRCMS, **poster**); Ali Younis (2019 UCF SURE Conference, **poster**); Alan Trudeau (2019 UCF SURE Conference, **poster**, and 2019 ABRCMS, **poster**); Julissa Burgos (2019 UCF SURE Conference, **poster**; 2019 ABRCMS, **poster**); Dylan Thibaut (2019 UCF SURE Conference, **poster**).

Classes taught:

* Biochemistry I (BCH4053): Fall 2018, Spring 2019, Fall 2020, Spring 2022, Fall 2022, Spring 2023, Spring 2024, Fall 2024, Spring 2025.
* Biochemistry I Honors (BCH4053H): Fall 2019, Fall 2022
* Special Topics: Bioinorganic Chemistry (CHM4932/CHM5937): Spring 2021
* Bioinorganic Chemistry (CHM4671/CHM5675): Fall 2023

**Service and Outreach**

***Professional service*2018–present** Refereed journal manuscripts for *Nat. Chem. Biol.*, *J. Am. Chem. Soc.*, *Chem. Sci.*, *Chem. Commun.*, *RSC Adv.*, *RSC Med. Chem.*, *ACS Catalysis,* *Inorg. Chem, Inorg Chem. Frontier,* *J. Phys. Chem.*, *Biochemistry, J. Inorg. Biochem.*, *J. Biol. Inorg. Chem.*, *Biotechnol. Adv.*, *Dalton Trans.*, *Biochimie*, *Biomolecules, Appl. Mag. Res., Chemosphere*, and *Bioprocess. Biosyst. Eng.*

**2025** Organizing technical symposium for SERMACS 2025: “Prof. Donald Kurtz Celebration of Retirement”

**2025** Organizing technical symposium for SERMACS 2025: “Bioinorganic Chemistry in the Southeast and Southwest regions of ACS”

**2025** GrantReviewer for Physical Biosciences Section of Department of Energy

**2024** Session chair of technical session atMetallocofactors Gordon’s Research Conference. Easton, MA, *Jun 9–14, 2024.*

**2021** Judge for #BlackInChem poster competition

**2021** Session chair of symposium titled “Small molecule activation at biological or bio-inspired metal centers” at SERMACS 2021.

**2021** Organizer of 2020 ACS Fresenius Award Symposium in honor of Kyle Lancaster to held at the ACS National Spring Meeting in San Antonio, TX. (Virtual)

**2020** Co-organizer with Zach Tonzetich of symposium in honor of Donald Kurtz Retirement at the joint Southwest/Southeastern Regional ACS Meeting, in New Orleans, LA. (Cancelled due to Covid)

**2019** Session chair and organizer for “Recent Advances in Bioinorganic Chemistry” symposium at the 71st Southeastern Regional Meeting of the American Chemical Society (SERMACS) in Savannah, GA.

**2019** Served as reviewer onNIH Study section: Macromolecular Structure and Function A)

**2018** Session Chair in the symposium titled, “Nitrogen un-fixation: Mechanisms & Models of Nitrification/ Denitrification Reactions,” at the 255th American Chemical Society National Meeting and Exposition in New Orleans, LA in March of 2018.

***University and department service***University Committees

**2020-2022** University Research Committee

College Committees

**2025** RIA Selection Committee  
**2024-present** College Curriculum Committee  
**2024-2025** COS Graduate Awards Committee (Chair)  
**2025** Committee on Impact of Changes in Federal Guidelines on Research Activities (Chair)

Chemistry Department Committees

**2025-present** Chair advisory committee  
**2025** ChemistryDepartment Chair Search Committee **2024-2025** AESP Revision Committee  
**2023** Forensic Biochemistry tenure track search committee  
**2023** Biochemistry lecturer search committee  
**2022** Organiclecturer search committee **2021-present** Co-chair graduation admissions committee  
**2018-present** Graduate admissions committee **2020-present** Diversity and Inclusion Committee

Dissertation Committees

*Active***2021-present** Haley Davenport (Biomedical Sciences; Prof. Kyle Rohde)  
**2022-present** Kaitlyn Bonilla (Chemistry; Prof. Mattheu Baudelet)  
**2022-present** Zach Murphy (Chemistry; Prof. Vasileios Anagnostopoulos)  
**2022-present** Jack Trimble (Chemistry; Prof. Mattheu Baudelet)  
**2023-present** Akhmetzada Kargazhanov (Biomedical Sciences; Prof. James Hickman)  
**2023-present** Sarah Parker (Chemistry; Prof. Melanie Beazley)  
**2024-present** Payton Bowman (Biomedical Sciences; Prof. Hubert Salvail)  
**2024-present** Vivian Cruz-López (Biomedical Sciences; Prof. Kyle Rohde)  
**2024-present** Clarissandra Braun (Chemistry; Prof. Candice Bridge)  
**2024-present** Joey Lee (Chemistry; Prof. Vasileios Anagnostopoulos)  
**2024-present** Harun Kapidzic (Chemistry; Prof. Yulia Gerasimova)

*Complete*  
**2018-2020** Eduardo Romero (Chemistry; Prof. Eloy Hernandez)  
**2019-2021** Nameer Ezzat (Chemistry; Prof. Yu Yuan)  
**2019-2022** Ryan Connelly (Chemistry; Prof. Yulia Gerasimova)  
**2019-2022** Luz Kelley (Chemistry; Prof. Matthieu Baudelet)  
**2020-2022** Martin O’Steen (Chemistry; Prof. Dmitry Kolpashchikov)  
**2020-2022** Tatiana Molden (Chemistry; Prof. Dmitry Kolpashchikov)  
**2021-2023** Diana Ordonez (CECE; Prof. Ni-bin Chang)  
**2019-?** Greg Miller (Chemistry; Prof. Andre Gesquiere)  
**2019-2024** Lauren Bonefont (Biomedical sciences; Prof. Kyle Rohde)  
**2020-2024** Nick Young (Chemistry; Prof. Melanie Beazley)  
**2021-2024** Brittany Mueller (Chemistry; Prof. Dmitry Kolpashchikov)  
**2022-2024** Andrea Bardales (Chemistry; Prof. Dmitry Kolpashchikov)  
**2021-2025** Ilana Szlamkowicz (Chemistry; Prof. Vasileios Anagnostopoulos)

Honors Undergraduate Thesis Committee

**2023** Katherine Taylor **2023** Abdulrazak Kalae  
**2023-2024** Nidhi Patel **2023** Pedro Madalozzo **2022** Natali Barakat **2021** Lannika Johnson (Chair) **2021** Stephanie Oliveira  
**2019-2020**Rohit Karnati  
**2018–2019** Dylan Thibaut (Chair)

OtherUniversity Service

**2025** Lab tours for students organized by OUR and AAP  
**2025** Judging 2025 SURF Applications  
**2025** Judging 2025 Student Scholar symposium  
**2024** Judging 2024 Student Scholar symposium  
**2023** Judge for Champion of UG Research  
**2023** Lab tours for students organized by Office of Undergraduate Research  
**2022** Judging 2022 Student Scholar symposium  
**2022** Lab tours for students organized by Office of Undergraduate Research **2018–present**Faculty in Residence, UCF McNair Scholars Program, UCF.

Other Chemistry Department Service

**2023** Graduate student recruitment at FGCU  
**2018–present** Review undergraduate research reports  
**2021** Presented research for the UCF Graduate Program Virtual Open House  
**2021** Reviewed applications for department awards.  
**2020** Led department conversation on removing GRE as an admissions criterion.  
**2020** Co-authored Department anti-racism statement with 6 other Chemistry faculty  
**2018** Graduate student recruitment at 254th ACS National Meeting, Washington D.C., Aug. 20-24, 2017.  
**2018** Presented poster to Industry Advisory Board.  
**2018** Served on two (2) undergraduate seminar committees.  
**2018** Hosted Prof. Jane Nkhenenyane (Central University of Technology, FS, South Africa) for lab tour.

***Outreach***

**2024** UCF Lab Tours for Ying Competition Finalists coordinated by Dr. Shengli Zou  
**2023** Valencia UCF Lab Tours coordinated with Dr. Melonie Sexton (Valencia College)  
**2022** Valencia UCF Lab Tours coordinated with Dr. Melonie Sexton (Valencia College)  
**2020** Invited andparticipated in discussion panel on pursuingan academic career for students in MBRS-RISE program at UT-San Antonio  
**2020** Judge for 2019 US Crystal Growing Competition held at UCF.  
**2018** Presentation to the UCF student ACS chapter on career path and past and future research.  
**2018** Presentation to Seminole State student for completion of research class.