

James Vranish
Assistant Professor
Franciscan University of Steubenville

Education

PhD in Biochemistry and Biophysics
Texas A&M University, 2015

B.S. in Biochemistry
Minor in Theology
University of Notre Dame, 2006

Teaching Experience

Assistant Professor of Chemistry, Ave Maria University, Fall 2017-Present

- Teaching evaluation responses to “I would rate this instructor as excellent”
 - Overall score: 4.27 out of 5 (5=strongly agree)
 - Score has increased each semester to a most recent score of 4.61 out of 5 for the Spring of 2019
- Teaching experience in biochemistry, chemistry, biology, and physics courses at introductory and upper-levels
- Designed laboratory course in Biochemistry I and II with a research project focus that is directed towards a student-authored peer-reviewed publication
- Designed and implemented labs in General Chemistry I and II and Chemistry for the Health Sciences to reach students with biology interests
- Designed and taught a one-semester Principles of Biochemistry Course for Biology majors
- Designed and taught a two-semester Biochemistry course for Biochemistry majors
- Taught labs in Biology I and Genetics
- Will be teaching a Physics III (Electricity and Magnetism) Lab in the Spring of 2020
- Taught lecture courses in General Chemistry I and II, Biochemistry I and II, and Principles of Biochemistry
- Designed and taught half-semester lecture courses on Biochemistry of Alzheimer’s Disease, X-ray Crystallography, Metals in Biology, and Critical Analysis of the Scientific Literature
- Organized the 2nd Annual Paula Inés Castañet Lecture series on faith and science
- Taught Directed Research Lab every semester
- Designed and recorded an online Directed Studies version of the Principles of Biochemistry class

- Prepared video answer keys for Biochemistry I and II (available on YouTube)
- Taught overloads every semester
- Created proposals for a new “Cooking Chemistry” class and new majors (B.S. Biochemistry and B.S. Pre-Health Professional Studies)
- Developed by-laws and policies for the AMU Pre-Med Committee

Teaching Assistant, Texas A&M University, 2007-2015

- Taught recitation sections for Biochemistry I and II
- Taught labs for Organic Chemistry I, Organic Chemistry I for Chemistry Majors, and Organic Chemistry for Agricultural Majors
- Taught General Chemistry Labs

Research Experience

Assistant Professor of Chemistry, Ave Maria University, Fall 2017-Present

- Mentored approximately 6 students per semester in my lab
- Co-PI on a \$100,000 grant from the Florida Department of Health’s Ed and Ethel Moore Alzheimer’s Disease Research Program
- Written additional grants for the Florida Department of Health’s Ed and Ethel Moore Alzheimer’s Disease Research Program as the head P.I.
- Enzymology studies of SIRT1 activation using synthetic activators
- Demonstrated that methylation of nicotinamide by NNMT abolishes its ability to inhibit SIRT1
- Led the successful cloning of other genes in *E. coli* and yeast expression systems involved in Alzheimer’s disease pathology: Asparaginyl endopeptidase (AEP) and TREM2
- Obtained a \$4000 internal grant to begin mammalian cell culture for the purposes of expressing TREM2 in CHO cells
- Successfully doubly mutated SET, a protein substrate for AEP to allow for fluorescent labeling and AEP assay design
- Directed peptide synthesis projects aimed at producing fluorescent substrates for AEP and SIRT1
- Summer of 2018: Mentored a team of 4 students in biology and biochemistry on an Alzheimer’s research project involving SIRT1 and NNMT
- Additional research projects:
 - Creation of microscale materials containing enzyme-nanoparticle conjugates to facilitate enzyme removal from reaction mixtures
 - Design and construction of synthetic promoters aimed at responding to reactive oxygen species for use in metabolic engineering
- Designed Biochemistry I and II labs as a research project aimed at cloning, expressing, and characterizing putative lactate dehydrogenases from evolutionary clades that have not been investigated

- Students have written drafts of papers that will be submitted to peer-reviewed journals

Dr. Igor Medintz's Lab, U.S. Naval Research Laboratory, 2015-Present

- Investigated the mechanism of improved enzymatic function when bound to nanoparticle surfaces
- Developed systems of between 2 and 13 enzymes bound to a nanoparticle surface that have greatly enhanced catalytic function and probed the mechanism of the observed enhancements
- Assisted with the development of systems of immobilized enzymes on DNA nanostructures

Dr. David Barondeau's Lab, Texas A&M University, 2007-2015

- Developed fluorescence based assay for monitoring transfer of iron-sulfur clusters to a variety of apo-target proteins
- Investigated the role of monothiol and dithiol glutaredoxins in iron-sulfur cluster transfer using fluorescent kinetic assays
- Created modular plasmids for facile cloning of enzymes into a variety of fusion tagged vectors
- Successfully cloned, expressed, and purified numerous proteins involved in iron-sulfur cluster biosynthesis and transfer
- Investigated the function and DNA binding ability of putative spore photoproduct lyases (a DNA repair enzyme) using various *in vivo* and *in vitro* assays
- Successfully purified and crystallized nickel superoxide dismutase and carried out soaking experiments to bind a small molecule ligand to the open metal coordination site

Dr. Theodore Wensel's Lab, Baylor College of Medicine, Summer 2005

- Created DNA plasmid for use in fluorescent imaging of proteins involved in the signaling cascade for vision

Dr. Subhash Basu's Lab, University of Notre Dame, 2003-2006

- Assayed DNA helicase at various stages of chick development
- Assayed for the presence of urinary trypsin inhibitor in clinical samples

Lab assistant, Dr. David Severson's Lab, University of Notre Dame, 2002-2006

- Student lab worker
- Aided in the annotation of the *Aedes aegypti* genome

Honors and Awards

- National Research Council Research Associateship Program Postdoctoral Fellowship
- Phi Lambda Upsilon past member

- Chemistry honor society
- Various volunteer activities with the goal of advancing science education
- NIH Molecular Biophysics Training Grant Recipient
- Team Susie for Life Scholarship Recipient
 - Awarded to pro-life Texas A&M students who volunteered as sidewalk counselors outside the local Planned Parenthood abortion clinic
- 3rd degree Knight of Columbus
- Director's Award-University of Notre Dame Marching Band
- Section Leader-University of Notre Dame Marching Band Bass Section
- 2004 Section of the Year-University of Notre Dame Marching Band

Grants

1. Diana West, **James Vranish**, Stephen Cronin, and Tony Barbosa (principle P.I.). "Inhibiting Alzheimer's Disease By Modulating A Key Player In Plaque And Tangle Formation, SIRT1, By Regulating The Formation Of Nicotinamide Metabolites", a \$100,000 grant from the Florida Department of Health's Ed and Ethel Moore Alzheimer's Disease Research Program. 2018-2019.
2. **James Vranish**. Eukaryotic-cell expression system for use in Alzheimer's Research. \$4000. Laurel Family Grant. Ave Maria University.

Volunteering

- Ave Maria Little League, Ave Maria, FL
 - Coach of five teams
 - Volunteer umpire
 - Secretary, Spring 2019
 - President, Summer 2019-Spring 2020
 - Directed fundraising efforts, league budgetary improvements, league safety improvements, and overall improvements in costs and morale
- Donahue Academy in Ave Maria, FL
 - Chemistry demonstrations
 - Volunteered for concessions sales and scorekeeping duties for boys' and girls' basketball teams
- Ave Maria Catholic Parish, Ave Maria, FL
 - CYO basketball coach
- Ave Maria Athletics
 - Chain gang at football games
 - Helped control online broadcasts of basketball games
- Chemistry open house-Texas A&M University
 - Organized and designed chemistry demonstration booth for area grade school students
 - Participated in chemistry demos

- American Chemical Society-University of Notre Dame
 - Participated in science demonstration at a local elementary school
- Coalition for Life-Bryan, TX
 - Volunteered as a sidewalk counselor on numerous occasions
 - Received a scholarship for my efforts
- Knights of Columbus
 - Work at various parish events and fundraisers
- St. John's School-Hollywood, MD
 - Bingo caller
 - In charge of running several bingo events a year and managing pull-tab games and bingo games simultaneously
 - Bingo worker
 - Chairman for the Pat Suit 5K run
 - Built covered wagon decoration for school fundraising event

Hobbies

- Coaching
- Triathlons
- Woodworking

Peer-Reviewed Publications

1. Pugia MJ, Jortani SA, Basu M, Sommer R, Kuo HH, Murphy S, Williamson D, **Vranish J**, Boyle PJ, Budzinski D, Valdes R Jr, Basu SC. Immunological evaluation of urinary trypsin inhibitors in blood and urine: role of N- & O-linked glycoproteins. *Glycoconj J*. 2007 Jan. 24(1). 5-15.
2. **Vranish, JN**; Russell, WK; Yu, LE; Cox, RM; Russell, DH; Barondeau, DP. Fluorescent Probes for Tracking the Transfer of Iron-Sulfur Cluster and other Metal Cofactors in Biosynthetic Reaction Pathways. *J Am Chem Soc*. 2015. 137 (1). 390-398.
3. **Vranish, JN**; Das, D; Barondeau, DP. Real-Time Kinetic Probes Support Monothiol Glutaredoxins As Intermediate Carriers in Fe-S Cluster Biosynthetic Pathways. *ACS Chem Bio*. 2016. 11 (11). 3114-3121.
4. **Vranish, JN**; Ancona, M; Oh, E; Susumu, K; Medintz, IL. Enhancing Coupled Enzymatic Activity by Conjugating One Enzyme to a Nanoparticle. *Nanoscale*. 2017. 9 (16). 5172-5187.
5. **Vranish, JN**; Ancona, M; Walper, SA; Medintz, IL. Pursuing the Promise of Enzymatic Enhancement with Nanoparticle Assemblies. *Langmuir*. 2018. 34(9). 2901-2925.

6. **James Nicholas Vranish**, Mario G. Ancona, Eunkeu Oh, Kimihiro Susumu, Guillermo Lasarte Aragonés, Joyce C. Breger, Scott A. Walper, and Igor L. Medintz. Enhancing Coupled Enzymatic Activity by Colocalization on Nanoparticle Surfaces: Kinetic Evidence for Directed Channeling of Intermediates. *ACS Nano*. 2018. 12 (8), 7911-7926.
7. Sebastián A. Díaz, Guillermo Lasarte-Aragones, Robert G. Lowery, Aniket, **James N. Vranish**, William P. Klein, Kimihiro Susumu, and Igor L. Medintz. Quantum Dots as Förster Resonance Energy Transfer Acceptors of Lanthanides in Time-Resolved Bioassays. *ACS Applied Nano Materials*. 2018. 1 (6), 3006-3014.
8. William Klein, Rasmus Thomsen, Kendrick Turner, Scott A. Walper, **James Vranish**, Jorgen Kjems, Mario G. Ancona, and Igor L. Medintz. Enhanced Catalysis from Multienzyme Cascades Assembled on a DNA Origami Triangle. *ACS Nano*. Accepted Nov. 7, 2019.

Publications in Preparation

1. Johnson, C; West, D; **Vranish, JN**. Methylation of nicotinamide alleviates inhibition of SIRT1. In preparation

Conference papers

1. Sebastián A. Díaz^{a,*}, Guillermo Lasarte-Aragones^a, Robert G. Lowery^b, **James N. Vranish^a**, William P. Klein^a, Kimihiro Susumu^{c,d}, and Igor L. Medintz^{a,*}. Time-Gated FRET from terbium labeled antibodies to quantum dot acceptors for broad ADP sensing. *Proceedings of SPIE Photonics West*. 2019.

Dissertation

Vranish, JN. Development of Fluorescent Reporters for Monitoring Fe-S Cluster Transfer Reactions and Discerning the Role of Glutaredoxin Proteins in Fe-S Cluster Assembly. 2015. Doctoral dissertation, Texas A & M University.

Patents

1. *Nanoparticle-Attached Enzyme Cascades for Accelerated Multistep Biocatalysis* Igor L. Medintz, **James N. Vranish**, Mario Ancona, Kimihiro Susumu, Sebastian A. Diaz. Jun. 21, 2018. Pub No.: US 2018/0171325 A1

Research Talks

1. **Vranish, JN**; Barondeau, DP. A Novel Strategy for Monitoring Iron-Sulfur Cluster Transfer. 2013. Texas A&M ILSB Seminar Series.
2. **Vranish, JN**; Ancona, M; Oh, E; Susumu, K; Medintz, IL. Catalytic enhancement of multienzyme cascades co-localized on colloidal quantum dots. 2017. ACS National Meeting on Advanced Materials, Technologies, Systems & Processes. San Francisco, CA
3. **Vranish, JN**; Turner, K; Vanarsdale, E; Ancona, M; Oh, E; Susumu, K; Walper, S; Medintz, IL. Enhanced catalysis of glycolytic pathways by co-localization of enzymes on nanoparticle surfaces. July 2017. Gordon Research Seminar on Enzymes, Coenzymes, and Metabolic Pathways. Waterville Valley, NH.

Poster Presentations

1. **Vranish, JN**; Clayton, RP; Barondeau, DP. "Mechanistic Studies of Spore Photoproduct Lyase." 2011. Dr. A.I. Scott Symposium.
2. **Vranish, JN**; Yu, L; Clayton, RP; Barondeau, DP. "Novel Fluorescent Probes to Monitor Iron-Sulfur Cluster Transfer" 2012. Gordon Research Conference on Enzymes, Co-Enzymes, and Metabolic Pathways.
3. **Vranish, JN**; Barondeau, DP. "Rethinking Iron-Sulfur Cluster Transfer: Roles of Chaperones, Glutaredoxins, and Glutathione" 2013. Dr. A.I. Scott Symposium.
4. **Vranish, JN**; Winn, AM; Yu, L; Barondeau, DP. "Probing Iron-Sulfur Cluster Transfer Using a Novel Fluorescence Assay and Physiological Substrates" 2013. 7th International Conference on Fe-S Cluster Biogenesis and Regulation
5. **Vranish, JN**; Barondeau, DP. "Utilizing a Novel Fluorescence Assay to Determine the Mechanism of Iron-Sulfur Cluster Transfer" 2014. Texas Enzyme Mechanisms Conference.
6. **Vranish, JN**; Cox, RM; James, E; Yu, LE; Barondeau, DP. "Time to Shine: Fluorescence as a Powerful New Tool for Probing Iron-Sulfur Cluster Biosynthesis" 2014. Gordon Research Conference on Iron-Sulfur Enzymes.
7. **Vranish, JN**; Oh, E; Ancona, M; Susumu, K; Medintz, IL. "Catalytic Enhancement of Enzymatic Pathways on a Nanoparticle Surface" 2016. Gordon Research Seminar and Gordon Research Conference on Biocatalysis.
8. **Vranish, JN**; Oh, E; Ancona, M; Susumu, K; Medintz, IL. "Catalytic Enhancement of Enzymatic Pathways on a Nanoparticle Surface" 2016. Synthetic Biology: Engineering, Evolution, and Design.

9. **Vranish, JN**; Turner, K; Vanarsdale, E; Ancona, M; Oh, E; Susumu, K; Walper, S; Medintz, IL. “Enhanced Catalysis of Glycolytic Pathways by Co-localization of Enzymes on Nanoparticle Surfaces.” July 2017. Gordon Research Conference and Seminar on Enzymes, Coenzymes, and Metabolic Pathways. Waterville Valley, NH.

Presentations on Faith and Science

1. **Vranish, JN**. What’s missing from science writing? Bringing humanity into our manuscripts. June 2019. Society of Catholic Scientists Conference: What does it mean to be human?
2. **Vranish, JN**. Mini-brains: Rationale and Ethical Questions. Interdisciplinary Faculty Lunch Colloquium. November 2019. Ave Maria University
3. **Vranish, JN**. Mini-brains: Rationale and Ethical Questions. Interdisciplinary Student Lunch Colloquium. December 2019. Ave Maria University