Sambuddha Banerjee, Ph.D.
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Curriculum Vitae

Education

2010. Ph.D. (Bioinorganic Chemistry), Jadavpur University, Kolkata, India in. Title of the thesis "Syntheses, Crystal Structures, Magnetic and Biochemical Studies of Some First Row Transition Metal Complexes". Ph.D. Advisor: Prof. Samiran Mitra
2005. M.Sc. (Inorganic Chemistry), Presidency College, Kolkata, India, under University of Calcutta.
2003. B.Sc. (Chemistry), Maulana Azad College, Kolkata, India, Under University of Calcutta.

Professional Experience

Instructional Assistant Professor — **September 2025 to present**
Department of Natural Sciences
Texas A&M University San Antonio
San Antonio, TX, USA

Teaching Associate Professor — **January 2017 to May 2025**
Department of Chemistry
East Carolina University
Greenville, NC, USA

Assistant Professor — **February 2016 to December 2016**
Amity Institute of Applied Sciences
Amity University - Kolkata Campus
Kolkata, West Bengal, India

Postdoctoral Associate — **September 2013 to August 2015**
Lab of Prof. H. J. Vogel, Department of Biological Science
University of Calgary
Calgary, Canada

Postdoctoral Associate — **July 2010 to August 2013**
Lab of Prof. A. L. Crumbliss, Department of Chemistry
Duke University, Durham, USA

Guest Lecturer — **2006-2009**
Maulana Azad College
Department of Chemistry
Kolkata, West Bengal, India

Key Strengths

Personal statement: Dedicated researcher who has worked in diverse chemical biology research projects, investigating the interaction between small transition metal complexes with DNA, diseased cells, and pathogenic membranes; biophysical characterization of periplasmic and truncated membrane proteins from pathogens using calorimetric, UV-Vis spectroscopic, electrochemical, and NMR methods; and strategies to create sustainable and equitable environment for all in STEM. I have 12+ years of experience mentoring and teaching undergraduate students in diverse cultural context and integrating research at every level of teaching/mentoring to increase interest in STEM. Having identified the value of collaboration since my graduate work, I several maintain national and international collaborations for all research, teaching, and service work I am involved in. Have been fortunate to be awarded the Young Scientist Award (Indian Chemical Society, 2008), Alberta Innovate

Health Solutions Postdoctoral Fellowship (2013), Chancellor's Horizon Award for Diversity Equity and Inclusion (East Carolina University, 2021), Chancellor's Leadership Fellow (East Carolina University, 2021) and several other award nominations showing my dedication towards STEM, DEI, and leadership.

Scientific contributions: Have published 20+ peer reviewed articles with 900+ citation till date and an h-index of 17. Identified Cu^{2+} based inorganic complexes showing selective cytotoxicity towards leukemic cells in vitro. Identified the mechanism of iron translocation from host to pathogens using membrane and periplasmic proteins from several Gram negative pathogens. Have identified the mechanism of redox stabilization of cell free hemoglobin molecules associated with its scavenger proteins. Highly skilled in applying inorganic synthesis; protein cloning, expression, purification; various spectroscopic, electrochemical, and spin methods in solving biochemical problems.

Communication skills: Speak three global languages (English, Bengali, Hindi) fluently. Having taught chemistry to various undergraduate and graduate (chemistry and non-chemistry majors) as well as presented at various research conferences, can communicate disciplinary knowledge to different level of complexity to a broad range of audience. Strong written and oral communication skills as is displayed by the well-cited publication and presentation list.

Leadership qualities: Have taken leadership roles several university and national organizations (Chair, Department of Chemistry, Faculty Development Committee; Vice-chair, ECU DEI Faculty Senate Committee; Co-chair, UNC system API coccus, Chair American Chemical Society, Pride sub-division). Have been a fellow of the Chancellor's Leadership Academy, 2021. Served in the ECU Provost search committee. Co-created programs for faculty development with the office of faculty excellence.

Teaching Experience

At TAMUSA

- General Chemistry (Chem 1311)
- Biochemistry 4341 & Chem 4341-01L

At East Carolina University:

- General Chemistry 1 & 2 lecture; with Learning Assistants (Chem 1150, 1151)
- General Chemistry 1 & 2 lab; Inquiry based (Chem 1160, 1161)
- Biochemistry lecture and lab (Chem 3770, 2771)
- Metals in Biology (Chem 6529/4500)
- Science and Feminism (Chem5527/Gen 4000)
- Elementary Inorganic Chemistry Lab (Chem 3451)-CURE and traditional
- Elementary Inorganic Chemistry lecture (Chem 3450)
- Introduction to Chemical Literature (Chem 2103)

Professional Development trainings

- Fixed term faculty summer learning community in collaboration with the Office of faculty excellence. (Co-creator of this summer institute in Summer 2022.
- Chancellor's Leadership Academy, 2021.
- I-CORE training sponsored by REDE, Summer 2022 and 2023.
- Linguistic Justice, WAC Academy, University Writing Center, Summer 2024.
- Intercultural Summer Institute, ECU QEP, Summer 2024.

Certifications

- Writing Across the Curriculum (2024)
- Intercultural Development Inventory (IDI) Qualified Administrator (2024)
- Adobe Creative Cloud (2021)

Fellowships and Grants

- **Alternative textbook program, ECU Libraries** (received)
  Program to write textbook for university inorganic chemistry
- **Fe^{2+} oxidase activity of periplasmic FtrA and FtrB** (Received)
  MOSBRI, Summer 2025
  Role: PI
- **Investigating interaction between *Brucella* FtrA and FtrB and its effect on iron transport** (under review)
  Proposed funding period: July 2025-June 2028
  $577,587
  Role: PI
- **STEM Underground: Interrupting the Effects of Structural Inequity in Undergraduate STEM Experiences** (NSF, submitted)
  Proposed funding period: August 2024-August 2029
  $ 3,975,515
  Role: Co-PI
- **ECU Faculty Senate 2023 Faculty Support and Reassignment Awards: Investigating interaction between periplasmic FtrA and FtrB from *Brucella* using ^{15}N NMR-HSQC experiments** (Received)
  Proposed funding period: Spring 2023
  $5000 (Graduate student support)
  Role: PI

Selected Publications

1. A. Kerkan, K. Hart, D. W. Martin, B. Aidoo, B. L. Garcia, S. Roy, S. Dasgupta, J. Pajski, S. Hematian, N. Schaaf, **S. Banerjee**. In Vitro Structural and Functional Studies of a Novel Cupredoxin, FtrB, From *Brucella abortus* 2308. **2025** (accepted manuscript), *ACS Omega*.
2. **S. Banerjee**, A. Kerkan, K. Hart. Notes of differential scanning calorimetry (DSC) data reported in “New insights into the mechanism of iron transport through the bacterial Ftr system present in pathogens” for recombinant wild-type RgFtrB. **2024** (under preparation).
3. J. Barnes, **S. Banerjee**, C. Chambers. Shining light on Black STEM students’ experiences in a PWI using critical race theory, intersectionality, and postmodern theory. **2024** (under review). *Stacks J.*
4. U. Swamy, E. Moore, E. Lebeau, **S. Banerjee**, L. Frost, J. Moro, M. Patrick, G. Cartmill, T. Moore, R. O’Hara. (2024) Making Chemistry Authentic, Equity-Focused Strategies in the Classroom. Pearson Education.
5. **S. Banerjee**, M. A. C. Reyes. **2024**. Reply to Comment on: "A Special Topic Class in Chemistry on Feminism and Science as a Tool to Disrupt the Dysconcious Racism in STEM". *J. Chem. Ed.,***101**,
6. A. Kerkan, K. Hart, S. Dasgupta, D. W. Martin, N. J. Schaaf, B. Aidoo, R. Alvarez-Bell, Alice Haddy, S. Hematian, J. J. Pajski, **S. Banerjee**. **2024** (under preperation) Biochemical evidence of Cu-ion binding to *Brucella* FtrB, a novel cupredoxin**.**

7. M. A. Reyes, **S. Banerjee**, J. Hall, Y. H. Odeh, A. Garcia, A. Benton, A. Moffett, D. McCunney, D. Bose. **2023,** A special topic class in chemistry on feminism and science as a tool to disrupt the dysconcious racism in STEM. ***J. Chem. Ed.***, **100**, 112.
8. **S. Banerjee**, M. N Chanakira, J. Hall, A. Kerkan, S. Dasgupta, D. W. Martin. **2022,** A Review on Bacterial Redox Dependent Iron Transporters and Their Evolutionary Relationship. ***J. Inorg. Biochem.,* 229,** 111721.
9. A. Crumbliss, **S. Banerjee**. **2021**, A perspective essay on the use of Ga^{3+} as a proxy for Fe^{3+} in bioinorganic model studies and its successful use for therapeutic purposes. ***J. Inorg. Biochem***., **219**, 111411.
10. **S. Banerjee**, R. J. Garrigues, *M. N. Chanakira*, *J. J. Negron-Olivo*, *Y. H. Odeh*, A. M. Spuches, R. M. Roop II, J. E. Pitzer, D. W. Martin, S. Dasgupta. **2020**, Investigating the roles of the conserved Cu^{2+}-binding residues on Brucella FtrA in producing conformational stability and functionality. ***J. Inorg. Biochem***., **210**, 11162.
11. S. Paul, S. Banerjee, H. J. Vogel. 2016, Ligand binding specificity of the *Escherichia coli* periplasmic histidine binding protein, HisJ. *Prot. Sci.*, 64, 268-279.
12. **S. Banerjee**, S. Paul, L. T. Nguyen, B. C. H. Chu, H. J. Vogel. **2016**, FecB, a periplasmic ferric-citrate transporter from *E. coli,* can bind different forms of ferric-citrate as well as a wide variety of metal-free and metal-loaded tricarboxylic acids. ***Metallomics***, **8**, 125-133.
13. **S. Banerjee**, A. J. Weerasinghe, C. J. P. Siburt, *R. T. Kreulen*, S. K. Armstrong, T. J. Brickman, L. A. Lambert, and A. L. Crumbliss. **2014**, Bordetella pertussis FbpA binds both unchelated iron and iron-siderophore complexes. ***Biochemistry***, **53**, 3952-3960.
14. T. L. Mollan, Y. Jia, **S. Banerjee**, G. Wu, *R. T. Kreulen*, A.-L. Tsai, J. S. Olson, A. L. Crumbliss, A. I. Alayash. **2014**, Redox Properties of Human Hemoglobin in Complex with Fractionated Dimeric and Polymeric Human Haptoglobin. ***Free Radic. Biol. Med***., **69**, 265-277.
15. C. Bonaventura, R. Henkens, A. I. Abdu, **S. Banerjee**, A. L. Crumbliss. **2013**, Redox Reactions of Hemoglobin: Mechanism of Toxicity and Control. ***Antioxid. Redox Sig***. (Forum review article), **18**, 2298-2313.
16. T. L. Mollan, **S. Banerjee**, G. Wu, C. J. P. Siburt, A. Tsi, J. S. Olson, M. J. Weiss, A. L. Crumbliss, A. I. Alayash. **2013**, Alpha-hemoglobin stabilizing protein (AHSP) markedly decreases the redox potential and reactivity of alpha subunits of human HbA with hydrogen peroxide. ***J. Biol. Chem***., **288**, 4288-4298**.**
17. **S. Banerjee,** C. J. Parker Siburt, S. Mistry, J. M. Noto, P. DeArmond, M. C. Fitzgerald, L. A. Lambert, C. N. Cornelissen, A. L. Crumbliss. **2012**, Evidence of Fe^{3+} interaction with the plug domain of the outer membrane transferrin receptor protein of *Neisseria gonorrhoeae:* Implications for Fe transport. ***Metallomics***, **4**, 361-372.

18. **S. Banerjee**, C. J. P. Siburt, F. Wood, Y. Jia, C. Bonaventura, R. Henkens, A. L. Crumbliss, A. Abdu. **2012**, Haptoglobin Alters Oxygenation and Oxidation of Hemoglobin and Decreases Propagation of Peroxide-Induced Oxidative Reaction. ***Free Radic. Biol. Med.***, **53**, 1317-1326.
19. D. Tran**, S. Banerjee,** A. L. Crumbliss, M. Fitzgerald. **2012**, Slow Histidine H/D Exchange Protocol for Thermodynamic Analysis of Protein Folding and Stability using Mass Spectrometry. ***Anal. Chem***., **84**, 1653-1660.
20. **S. Banerjee**, S. Mondal, S. Sen, S. Das, D. L. Hughes, C. Rizzoli, C. Desplanches, C. Mandal, S. Mitra. **2009**, Four New Dinuclear Cu(II) Hydrazone Complexes Using Various Organic Spacers: Syntheses, Crystal Structures, DNA Binding and Cleavage Studies and Selective Cell Inhibitory Effect Towards Leukemic and Normal Lymphocytes. ***Dalton Trans***., 6849-6860.

Presentations

In the discipline

1. Expanding the vocabulary of Cu-containing proteins. Oral presentation in the Emerging Stars in Biochemistry and Chemical Biology Symposium in American Chemical Society, Spring 2024 National Meeting.
   Ending the semester with (a) Spark. Presented at the symposium How did I survive the pivot, East Carolina University. October 2020.
2. "Beyond boring chemistry class lectures," an interactive lecture delivered to junior scholars (High School Students) of Jagadis Bose National Science Talent Search (JBNSTS), June 10th 2016.
3. "Irony of iron," a lecture delivered to students, scholars and faculty of department of chemistry, Jadavpur University, October 2012.
4. Keynote speaker at CREATORS, University of Kansas.
5. Keynote speaker at MWRDC (Midwest Retreat for Diversity in Chemistry) 2024.
6. Why the "fixed-term" issue in the US academy is an academic ethics issue? Oral presentation in the Ethics in Chemistry symposium in American Chemical Society, Spring 2024 National Meeting.
   How to navigate the academy as a queer faculty/postdoc/graduate student in STEM, OSTEM Professional Development Summit, 4th March 2023.
7. Learning equity in STEM classes. Out in STEM National Meeting, 13th November 2020.

Academic Committee/ Advising/Mentoring:

- **Chair, ACS Minority Chemists Sub-division** (2025)
- **Chair, ACS Pride** (2023)
- **Member of ACS DEIR round table** (2023)
- **Advisory board, The Dignity Journal, UNC** (ongoing)
- **Provost Search Committee** (Summer 2021)
- **Chemistry Department Fixed Term Faculty Search Committee** (Summer 2021)
- **Vice-chair Faculty Senate DEI Committee** (Until 2023)
- **President, oSTEM for Professionals** (Since 2021)
- **Graduate student advising**: 2 (Fall 2023)
- **Undergraduate research advising**: 3 (Fall 2023)
- **Graduate Thesis Committee Advising:** 3 (Fall 2023)
- **Undergraduate student advising:** 16 (Fall 2023)

- **Faculty Advisor for OStem** (Out in Stem) student organization (Fall 2019 till date)

Awards and fellowship

- OED Faculty Resource Community, Fall 2023
- NSF I-CORP participant, Summer 2023
- Truist Active Learning and Leadership Fellow, ECU, OFE, Spring 2023
- Royal Society of Chemistry, Inclusion and Diversity Award, 2022 (nominated)
- East Carolina University, Leadership Development Academy, Spring 2021
- East Carolina Alumni Association Teaching Award, Fall 2020 (Nominated)
- Summer Biomedical Research Program, East Carolina University, Summer 2019
- Who Inspires you at ECU, Mentorship Breakfast, Women and Gender Office, East Carolina University (Nominated and selected), Spring 2019.
- Honored Instructor Award, Campus Living, East Carolina University, Fall 2018, Spring 2019.
- East Carolina University, Creed Award (nominated), Spring 2019.
- Poster selected for oral presentation under the module **Data Blitz** in Gordon Research Seminar, held at Ventura, California from 3rd to 6th February 2011.
- The talk delivered at Acharya Prafulla Chandra Ray Memorial Symposium on Chemistry Today (1st and 2nd August 2008), organized by the Indian Chemical Society, won the **"Young Scientist Award"** presented by **Indian Chemical Society.**
- The poster presented at International Conference on Structure and Dynamics: From Micro to Macro, (Dec. 14-16, 2006), organized by the Department of Chemistry, University of Calcutta, was ranked among **"Best Five posters".**
- Calgary Outlink, Volunteer Appreciation Award, Calgary, Canada, 2015.
  Outstanding contribution award, Women's Resource Center, University of Calgary, Canada, 2015.

Student (Undergraduate and Graduate) Research Supports

- LSAMP Undergraduate Summer student funding, Sebastian Mendez-Rodriguez, Summer 2024
- SBRP Undergraduate Summer student funding, Bridget Aidoo, Summer 2024
- LSAMP Undergraduate Summer student funding, Bridget Aidoo, Emmanuel DeDiavoukana, **Summer 2023**
- Undergraduate Research Creativity Activity (URCA), ECU, **Spring 2023**, Student Applicant: Jada Barnes
- Transfer Student Research Funding, **Spring 2022**, Alexa Kerkan
- Marie Maynard Daly Scholarship- Eastern NC Local ACS Chapter, **Summer 2021**, Alexa Kerkan
- Chemistry REU Student, **Summer 2021**, Alexa Kerkan.
- NSF Graduate Research Fellowship, **2021 term**, Student Applicant: Amina Butler
- Promoting Undergraduate Research in Chemistry (PURC), ECU, **Fall 2020**, Student Applicant: **Cruz R. Eakes**
- Promoting Undergraduate Research in Chemistry (PURC), ECU, **Fall** 2020, Student Applicant: **Jonathan Hall**
- Undergraduate Research Creativity Activity (URCA) Mini, ECU, **Fall 2020**, Student Applicant: **Cruz R. Eakes**
- Undergraduate Research Creativity Activity (URCA) Mini, ECU, **Fall 2020**, Student Applicant: **Jonathan Hall**

- Undergraduate Research Creativity Activity (URCA), ECU, **Spring 2020**, Student Applicant: **Cruz R. Eakes**
- Undergraduate Research Creativity Activity (URCA), ECU, **Fall 2019**, Student Applicant: **Mina N. Chanakira**
- Promoting Undergraduate Research in Chemistry at ECU, **Fall 2019**. Student applicant: **Mina N. Chanakira**
- Promoting Undergraduate Research in Chemistry at ECU, **Fall 2019**. Student applicant: **Remington C. Eakes**
- Undergraduate Research Creativity Activity (URCA), ECU, **Fall 2018**, Student Applicant: **Mina N. Chanakira**
- Chemistry Undergraduate Research Experience at ECU (CURE), Fall 2018, Student Applicant: **Mina N. Chanakira**
- Chemistry Undergraduate Research Experience at ECU (CURE), **Spring 2018**, Student Applicant: **Jacob J Negron**
- Chemistry Undergraduate Research Experience at ECU (CURE), **Fall 2017** Student Applicant: **Yasemene H Odeh**

Papers/ posters presented (last five years)

1. Practicing what we theorize: Why the academy has so many leaky pipelines? **S. Banerjee**. ACS Fall 2023. (Pres. Div. Talk).
2. Synthesis and characterization of brucebactin-a siderophore required by Brucella spp. to infect pregnant cattle. E. DeDiavoukana, **S. Banerjee**, C. E. Eakes, A. Weerasinge. ACS Fall 2023.
3. DEIR efforts in STEM departments at ECU post racial violence in the summer of 2020 and the continued disembodied experiences pf African American STEM students. J. Barnes, **S. Banerjee**. ACS Fall 2023
4. EPR studies on Cu^{2+} saturated FtrA and FtrB from Brucella, periplasmic proteins predicted to oxidize Fe^{2+}. K. Hart, **S. Banerjee**, A. Haddy, E. Anderson. ACS Fall 2023.
5. *Brucella* FtrB: A novel cupredoxin. A. Kerkan, **S. Banerjee**, D. W. Martin, B. Garcia, S. Roy, M. R. Roop Mid-Atlantic Microbial Pathogenesis Meeting (MAMPM) **2022**, Wintergreen, VA (Abstract accepted for presenting).
6. Characterizing *Brucella* FtrB: A novel cupredoxin. A. Kerkan, S. Banerjee, D. W. Martin, B. Garcia, S. Roy, M. R. Roop. 2021 ACS Southeast Regional Meeting (SERMACS), Birmingham, AL, November 10-13, 2021.
7. Predicted functions of FtrA and FtrB protein from the four-component uptake system, FtrABCD, in *Brucella spp*. M. N. Chanakira, **S. Banerjee**, R. M. Roop, and D. Martin. 2018 ACS Southeast Regional Meeting (SERMACS), Savannah, GA, USA. October 20-23rd, 2019
8. Trojan horse approach: Novel drug delivery mechanism. R. C. Eakes, **S. Banerjee**, S. Stamey, and D. Martin. 2018 ACS Southeast Regional Meeting (SERMACS), Savannah, GA, USA. October 20-23rd, 2019
9. FtrA, the periplasmic component of the putative Fe2+ transport system from Brucella spp. binds Cu^{2+} and Mn^{2+} (an Fe^{2+} mimic) using conserved residues. **S. Banerjee**, M. N. Chanakira, R. M. Roop II, D. W. Martin, R. J. Garrigues, A. M. Spuches. 2018 ACS Southeast Regional Meeting (SERMACS), Augusta, GA, USA. October 31-November 3rd, 2018.

10. Ligand specificity and promiscuity in Periplasmic Binding Proteins (PBP). **S. Banerjee.** Poster presented in the National Symposium on Recent Advances in Chemistry and Industry organized by the Indian Chemical Society, India, August 2-3, 2016.
11. The functional continuum of periplasmic iron transport proteins: ferric binding proteins (FbpA) bind both unchelated and chelated iron. C. J. P. Siburt, **S. Banerjee**, A. Weerasigne, R. T. Kreulen, A. L. Crumbliss. Poster at 9th international Biometals symposium July 13-18, 2014.
12. FecB: A Ferric-citrate transporter from E. coli, structural and biophysical studies. **S. Banerjee** , S. Paul , L. T. Nguyen , B. C. Chu , H. J. Vogel. Poster at 9th international Biometals symposium July 13-18, 2014.
13. Iron (III) transport system substrate-binding protein FbpA: a point of convergence for multiple iron transport systems essential for *Bordetella* multiplication and survival *in vivo.* T. J. Brickman, A. J. Weerasinghe, **S. Banerjee**, C. J. P. Siburt, A. L. Crumbliss , S. K. Armstrong. Poster at 10th international symposium on Bordetella, September 8-11, 2013, Dublin, Ireland.

Reference reports for peer-reviewed journals (last 5 years)

Reviewed papers submitted to:
Dalton Transactions (RSC)
Metallomics (RSC)
Med. Chem. Comm. (RSC)
J. Inorg. Bioche. (Elsevier)
BBA
BioMolecules