– DEVLEENA SAMANTA –

Northwestern University
Department of Chemistry
International Institute for Nanotechnology
2190 Campus Drive
Evanston, IL 60208

www.devleenasamanta.com
Email: dsamanta@northwestern.edu

EDUCATION AND TRAINING

Northwestern University – Evanston, IL 2017-
International Institute for Nanotechnology Postdoctoral Fellow
Advisor: Chad A. Mirkin

Stanford University – Stanford, CA 2017
Winston Chen Stanford Graduate Fellow and Center for Molecular Analysis and Design Fellow
Ph.D. in Chemistry (GPA 4.0/4.0)
Advisor: Richard N. Zare

Virginia Commonwealth University – Richmond, VA 2012
M.S. in Chemistry (GPA 4.0/4.0)
Advisor: Purusottam Jena

St. Xavier's College, Calcutta University – Kolkata, India 2010
B.S. with Honors in Chemistry (Ranked 3rd)

SELECTED RESEARCH EXPERIENCE

Northwestern University | Postdoctoral Fellow 2017-

- Pioneered the first DNA-protein conjugates that enable high-throughput, quantitative chemical analysis of live cells with single-cell resolution
- Invented a new class of fluorescent DNA probes containing a single modification that can detect a library of molecules (e.g. markers of mercury poisoning, stress, thrombosis, and cancer) in clinical samples
- Developed a chemical strategy for dynamically controlling interparticle spacings (~3-30 nm) in DNA-mediated colloidal crystals with sub-nanometric precision

Stanford University | Graduate Researcher 2013-2017

- Discovered that aqueous microdroplets are redox active and spontaneously reduce biomolecules and inorganic salts that are stable in bulk water
- Discovered that microdroplet confinement can accelerate chemical reactions by >five orders of magnitude
- Developed the first acoustically powered electroresponsive drug delivery system based on conducting polymer nanoparticles for programmed release of anti-cancer, anti-diabetes, and anti-arthritis drugs
- Developed microfluidic devices for the detection of single cells of pathogenic bacteria

SELECTED AWARDS AND HONORS

- Outstanding Researcher Award, International Institute for Nanotechnology 2019
- International Institute for Nanotechnology Postdoctoral Fellowship 2019-
- HHMI Hanna Gray Fellow Finalist Award ($10,000) 2019
- AIChE Women in Chemical Engineering Travel Award ($1,000) 2019
- Global Innovation Festival 2016 Travel Award from DGIST, South Korea ($2,000) 2016
- Winston Chen Stanford Graduate Fellowship *(~4% of graduate students awarded at Stanford)* 2015-2017
- Center for Molecular Analysis and Design Fellowship at Stanford 2013-2015
- Project Oriented Chemical Education Fellowship, JNCASR, India *(~10 students awarded nationwide)* 2008
- Prof. S. N. Bose Birth Centenary Award, Calcutta Mathematical Society, Kolkata, India 2005

PUBLICATIONS *(* denotes equal contribution)*

25. Ebrahimi, S. B.*; **Samanta, D.***; Partridge, B. E.; Kusmierz, C. D.; Cheng, H. F.; Grigorescu, A. A.; Chávez, J. L.; Mirau, P. A.; Mirkin, C. A. Programming Fluorogenic DNA Probes for Rapid Detection of Steroids. *(under review)*

24. Li, Y.; Lin, H.; Zhou, W.; Sun, L.; **Samanta, D.**; Mirkin, C. A., Corner-, Edge-, and Facet-Controlled Growth of Nanocrystals. *Sci. Adv.*, **2021**, *7*, eabf1410.

23. Zhou, W.; Liu, Z.; Huang, Z.; Lin, H.; **Samanta, D.**; Lin, Q.-Y.; Aydin, K.; Mirkin, C. A., Device-Quality, Reconfigurable Metamaterials from Shape-Directed Nanocrystal Assembly. *Proc. Natl. Acad. Sci.*, **2020**, *117*, 21052-21057.

22. Ebrahimi, S. B.; **Samanta, D.**; Mirkin, C.A., DNA-Based Nanostructures for Live-Cell Analysis. *J. Am. Chem. Soc.* **2020**, *142*, 11343–11356.
    - *Featured in JACS Spotlights*

21. **Samanta, D.***; Ebrahimi, S.*; Kusmierz, C.; Cheng, H. F.; Mirkin, C.A., Protein Spherical Nucleic Acids for Live-Cell Chemical Analysis. *J. Am. Chem. Soc.* **2020**, *142*, 13350–13355.

20. **Samanta, D.***; Ebrahimi, S. B.*; Mirkin, C. A., Nucleic-Acid Structures as Intracellular Probes for Live Cells. *Adv. Mater.* **2020**, *32*, 1901743.

19. 

Samanta, D.; Iscen, A.; Laramy, C. R.; Ebrahimi, S. B.; Bujold, K. E.; Schatz, G. C.; Mirkin, C. A., Multivalent Cation-Induced Actuation of Colloidal Superlattices. *J. Am. Chem. Soc.* **2019**, *141*, 19973-19977.
    - *Journal cover*

18. Ebrahimi, S. B.*; **Samanta, D.***; Cheng, H. F.; Nathan, L. I.; Mirkin, C. A., Forced Intercalation (FIT) Aptamers. *J. Am. Chem. Soc.* **2019**, *141*, 13744-13748.

17. Lee, J. K.; **Samanta, D.**; Nam, H. G.; Zare, R. N., Micron-sized Water Droplets Induce Spontaneous Reduction. *J. Am. Chem. Soc.* **2019**, *141*, 10585-10589.

16. 

Lee, J. K.; **Samanta, D.**; Nam, H. G.; Zare, R. N., Spontaneous Formation of Gold Nanostructures in Aqueous Microdroplets. *Nat. Commun.*, **2018**, *9*, 1562.
    - *Top 50 most read Nature Communications articles in chemistry and materials science in 2018 | Stanford News | Science Daily | Phys.org | EurekAlert! | Futurity*

15. **Samanta, D.***; Hosseini-Nassab, N.*; McCarty, A. D.; Zare, R. N., Ultra-low Voltage Responsive Nanoparticles for Cancer Treatment. *Nanoscale*, **2018**, *10*, 9773-9779.

14. **Samanta, D.***, Mehrotra, R.*; Margulis, K.*; Zare, R. N., On-Demand Electrically Controlled Drug Release from Resorbable Nanocomposite Films. *Nanoscale*, **2017**, *9*, 16429-16436.
    - *Invited by Atlas of Science to write a lay summary (Electrifying Drug Delivery)*

13. Hosseini-Nassab, N.*; **Samanta, D.***; Abdolazimi, Y.; Annes, J. P.; Zare, R. N., Electrically Controlled Release of Insulin using Polypyrrole Nanoparticles. *Nanoscale*, **2017**, *9*, 143-149.
    - *Featured in the 2017 HOT article collection of Nanoscale*
    - *Invited by Atlas of Science to write a lay summary (Electrically Controlled Insulin Release)*

12. **Samanta, D.***; Hosseini-Nassab, N.*; Zare, R. N., Electroresponsive Nanoparticles for Drug Delivery on Demand. *Nanoscale*, **2016**, *17*, 9310-9317.

11. Charthad, J.; Baltsavias, S.; **Samanta, D.**; Chang, T. C.; Weber, M. J.; Hosseini-Nassab, N.; Zare, R. N.; Arbabian, A., An Ultrasonically Powered Implantable Device for Targeted Drug Delivery. *Engineering in Medicine and Biology Society (EMBC)*, **2016**.

10. **Samanta, D.**; Meiser, J. L.; Zare, R. N., Polypyrrole Nanoparticles for Tunable, pH-Sensitive and Sustained Drug Release. *Nanoscale*, **2015**, *7*, 9497-9504.

9. **Samanta, D.**, Prediction of Superhalogen-Stabilized Noble Gas Compounds. *J. Phys. Chem. Lett.* **2014**, *5*, 3151-3156.
8. Behera, S.; King, N.; **Samanta, D.**; Jena, P., Potential of ZrO Clusters as Replacement Pd Catalyst. *J. Chem. Phys.* **2014**, *141*, 034301.
7. Rao, B. K.; **Samanta, D.**; Joshi, S.; Basu, K.; Baldwin, S. D.; Jha, A.; Dukat, M.; Glennon, R. A.; Jena, P., Receptor-Ligand Interaction at 5-HT_3 Serotonin Receptors: A Cluster Approach. *J. Phys. Chem. A.* **2014**, *118*, 8471-8476.
6. Knight, D. A.; Zidan, R.; Lascola, R.; Mohtadi, R.; Chen, L.; Sivasubramanian, P. K.; Kaduk, J.; Hwang, S. J.; **Samanta, D.**; Jena, P., Synthesis, Characterization, and Atomistic Modeling of Stabilized Highly Pyrophoric $Al(BH_4)_3$ via the Formation of the Hypersalt $K[Al(BH_4)_4]$. *J. Phys. Chem. C.* **2013**, *117*, 19905-19915.
5. Behera, S.; **Samanta, D.**; Jena, P., Nitrate Superhalogens as Building Blocks of Hypersalts. *J. Phys. Chem. A.* **2013**, *117*, 5428-5434.
4. **Samanta, D.**; Jena, P., Zinc in the +III Oxidation State. *J. Am. Chem. Soc.* **2012**, *134*, 8400-8403.
3. **Samanta, D.**; Wu, M. M.; Jena, P., Unique Spectroscopic Signature of Nearly Degenerate Isomers of $Au(CN)_3$ Anion. *J. Phys. Chem. Lett.* **2011**, *2*, 3027-3031.
2. **Samanta, D.**; Wu, M. M.; Jena, P., $Au(CN)_n$ Complexes: Superhalogens with Pseudohalogens as Building Blocks. *Inorg. Chem.* **2011**, *50*, 8918-8925.
1. Pathak, B.; **Samanta, D.**; Ahuja, R.; Jena, P., Borane Derivatives: A New Class of Super- and Hyperhalogens. *ChemPhysChem* **2011**, *12*, 2422-2427.

PATENTS

2. "FIT-Flares for the Detection of Intracellular Analytes in Live Cells" Mirkin, C. A.; Ebrahimi, S. B.; Samanta, D., PCT/US2020/042835, filed July 2020.
1. "Forced Intercalation (FIT)-Aptamers: Probes based on Forced Intercalation" Mirkin, C. A.; Ebrahimi, S. B.; Samanta, D.; Cheng, H. F., PCT/US2020/038778, filed June 2020.

INVITED TALKS

11. *ACS National Meeting*, Virtual Seminar, August **2020**
10. *The Hebrew University of Jerusalem Department of Pharmacy Seminar*, Jerusalem, Israel, May **2020**
9. *SPIE-MRSEC Student Seminar Series at Northwestern University*, Evanston, IL, January **2020**
8. *International Symposium on Clusters and Nanomaterials*, Richmond, VA, November **2019**
7. *Virginia Military Institute*, Lexington, VA, November **2019**
6. *ACS National Meeting*, Philadelphia, PA, March **2016**
5. *Stanford University Humanities & Sciences Graduate Research Salon*, Stanford, CA, February **2016**
4. *Lady Brabourne College,* Kolkata, India, July **2014**
3. *Saha Institute of Nuclear Physics*, Kolkata, India, July **2014**
2. *Indian Association for the Cultivation of Sciences*, Kolkata, India, July **2014**
1. *Saha Institute of Nuclear Physics*, Kolkata, India, May **2012**

CONTRIBUTED PRESENTATIONS

17. *2020 Virtual AIChE Annual Meeting*, November **2020** *(oral and poster)*
16. *2019 AIChE Annual Meeting*, November **2019** *(poster)*
15. *GRS/GRC (Clusters and Nanostructures)*, South Hadley, MA, July **2017** *(poster)*
14. *ACS National Meeting*, San Francisco, CA, April **2017** *(talk)*
13. *DGIST Global Innovation Festival*, Daegu, South Korea, December **2016** *(poster)*
    - ***awarded best poster***
12. *Center for Molecular Analysis and Design Symposium*, Stanford, CA, May **2016** *(talk)*

11. *Stanford Polymer Collective Poster Symposium*, Stanford, CA, March **2016** *(poster)*
    - ***awarded best poster***
10. *International Symposium on Clusters and Nanostructures*, Richmond, VA, October **2015** *(talk)*
    - ***selected as a hot topic***
9. *Bio-X Seed Grants Symposium at Stanford University*, Stanford, CA, August **2015** *(poster)*
8. *Stanford Polymer Collective Poster Symposium*, Stanford, CA, April **2015**
    - ***awarded best poster***
7. *Bio-X Seed Grants Symposium at Stanford University*, Stanford, CA, February **2015** *(poster)*
6. *International Symposium on Small Particles and Inorganic Clusters*, Leuven, Belgium, July **2012** *(poster)*
5. *CECAM Workshop at EPFL*, Lausanne, Switzerland, July **2012** *(talk)*
4. *International Symposium on Clusters and Nanostructures*, Richmond, VA, November **2011**
    - ***selected as a hot topic***
3. *Summit on Systems Biology 2011*, Richmond, VA, June **2011** *(poster)*
2. *ACS National Meeting*, Denver, CO, April **2011** *(talk)*
1. *APS March Meeting*, Dallas, Texas, March **2011** *(talk)*

TEACHING EXPERIENCE

Head Teaching Assistant, Stanford University

CHEM 176 Physical Chemistry Laboratory II	Jan-Mar 2014

Teaching Assistant, Stanford University

CHEM 134 Analytical Chemistry Laboratory	Apr-Jun 2013
CHEM 176 Physical Chemistry Laboratory II	Jan-Mar 2013
CHEM 31X Chemical Principles	Sep-Dec 2012

Teaching Assistant, Virginia Commonwealth University

CHEZ 102 General Chemistry II Lab	Jan-May 2012
CHEZ 302 Organic Chemistry II Lab	Aug-Dec 2011
CHEZ 101 General Chemistry I Lab	Jan-May 2011
CHEZ 101 General Chemistry I Lab	Aug-Dec 2010

STUDENTS MENTORED

Graduate students	**Undergraduate students**	**High school students**
Sasha Ebrahimi (2 yrs.)	Levy Nathan (2 mos.)	Julian Mondragon (4 mos.)
Jana van den Berg (1 yr.)	Daphney Sihwa (2 mos.)	Kaitlin Mrksich (2 mos.)
Christian Chamberlayne (6 mos.)	Shawn Joshi (3 mos.)	William Terry (2 mos.)
Ruiying Zhou (2 mos.)	Aidan McCarty (6 mos.)	Rohan Mehrotra (1 yr.)
		Alicia Leong (1 yr.)

LEADERSHIP

Leader, Anisotropic Nanomaterials Subgroup, Mirkin Group, Northwestern University 2018-
- Oversee the research of ~25 graduate students, postdocs, and undergraduates
- Coordinate and prepare funding agency proposals and reports

President, Stanford Bengali Association, Stanford University 2014-2015
- Led the organization for Bengali community at Stanford
- Integrated students and postdocs from various racial and ethnic backgrounds into the association to increase awareness about Bengali culture

EDUCATIONAL OUTREACH

Judge, AIChE Undergraduate Student Poster Competition 2019-
- Evaluated 6-9 posters/year for undergraduate student researchers

Mentor, Research Programs at Stanford University, Stanford, CA 2015-2017
- Stanford Institutes of Medicine Summer Research Program

- Inspiring Future Scientists through Shadowing

Teacher, Stanford Splash! 2014-2016
- Created and taught two new courses to ~130 high school students

Volunteer, Local Schools in the Bay Area 2013-2014
- Volunteered (science fair judge, scientific demonstrations) at science workshops designed for elementary- and middle-school students with disabilities

Science Demonstrator, Birla Industrial and Technological Museum, Kolkata, India 2009
- Performed scientific demonstrations and explained the science behind the museum exhibits to visitors

Tutor, National Service Scheme, Kolkata, India 2007-2008
- Tutored ~20 underprivileged school children for free

FUNDING AND GRANTS

Through my fellowships and awards, I have been supported by ~$400,000 in funding. I have also assisted Prof. Zare at Stanford University and Prof. Mirkin at Northwestern University in writing multi-PI proposals resulting in >$15 million in funding from the NIH and DOE.

Updated Jan 23, 2021