

# SHREE BOSE

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## EDUCATION

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**DUKE UNIVERSITY SCHOOL OF MEDICINE** Durham, North Carolina  
**Medical Scientist Training Program (MD/PhD Candidate)** Expected: May 2023

Activities: Editor-in-Chief for Duke Science Review (research publication), Co-Chair for Appleseed Awards Committee (teaching awards to recognize exceptional residents and interns)

Award: F30 Ruth L. Kirschstein Individual Predoctoral NRSA for MD/PhD and other Dual Degree Fellowships (NIH)

**HARVARD UNIVERSITY** Cambridge, Massachusetts  
**B.A. *cum laude***, Molecular and Cellular Biology (Minor: Global Health and Health Policy) May 2016

Activities: Editor-in-Chief for Harvard Science Review, Volunteer EMT with Crimson EMS (serving on-campus events), Design Editor for Harvard Crimson (Student Newspaper), Tutor for Phillip Brooks House Association John Marshall Program (tutor for at-risk students), Designed curriculum and taught 7-week course to middle school students through Harvard Educational Studies Program

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## EXPERIENCE

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**PIPER INC.** San Francisco, California  
**Cofounder/Co-CEO** 2014–2022

Piper is the first toolbox a child can use to create a familiar Minecraft interface to learn and play with the basics of technology to create their own gadgets (playpiper.com). As a cofounder, I was responsible for raising over \$280K through a crowdfunding campaign and created the infrastructure for the startup. Piper was named one of Inc.com's Coolest College Startups and is currently valued at ~\$10M.

**ASM (AMERICAN SOCIETY OF METALS) MATERIALS EDUCATION FOUNDATION** Materials Park, Ohio  
**Board of Trustees** 2015–2018

The ASM Materials Education Foundation provides for the advancement of scientific and engineering knowledge. As a member of the board, I helped shape the direction of various initiatives meant to facilitate K-12 materials science education.

**NATIONAL ACADEMY OF FUTURE PHYSICIANS AND MEDICAL SCIENTISTS** Cambridge, Massachusetts  
**Academic Director** 2014–2017

As a speaker and academic director for the National Academy for Future Physicians and Medical Scientists and its sister organization, the National Academy for Future Scientists and Technologists, I have mentored K-12 students interested in future STEM careers.

**GIRLSTART** Austin, Texas  
**Global STEM Ambassador** 2013–2014

Girlstart is a national organization focused on fostering STEM education for K–12 girls, that has been recognized by Change the Equation as one of only four exemplary STEM education programs in the country. As the Girlstart global STEM ambassador, I worked on outreach and was honored at the annual luncheon.

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## SPECIAL RECOGNITIONS/HONORS

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**FEATURED IN INTERNATIONAL ADVERTISING CAMPAIGN FOR MICROSOFT WINDOWS 10 PC** 2018  
Highlighted as a medical student in international advertising campaign for Windows 10. Aired on Hulu, cable TV, etc. with subsequent features in Duke Med Alumni Magazine and the Falconer (FWCD alumni magazine).

**FUTURES CONGRESS, INVITATION FROM PRESIDENT MICHELLE BACHELET OF CHILE** Santiago, Chile  
**Speaker** 2018  
Invited on behalf of the Government of the Republic of Chile, the Chilean Congress and the Chilean Academy of Sciences to speak about developing science education initiatives in the country

**GLAMOUR MAGAZINE** New York City, New York  
**Top Ten College Women in Nation** 2015  
Recognized for creating accessible, educational tools for kids. Awarded \$3K scholarship, featured in April 2015 issue of Glamour Magazine (pg. 160), and honored at event in New York City.

**GOOGLE GLOBAL SCIENCE FAIR** Mountain View, California  
**Grand Prize Winner** 2011  
Competed against 10,000 students from 91 countries, awarded a \$50,000 Google scholarship, a trip to the Galapagos Islands with National Geographic Expeditions, and a trip to CERN

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## RESEARCH EXPERIENCE

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- PH.D. THESIS RESEARCH, DUKE UNIVERSITY SCHOOL OF MEDICINE** Durham, North Carolina  
**Investigating the Metabolic Reprogramming of Ovarian Tumors during Omental Metastasis** 2020–May 2022  
*Principal Investigator: Dr. Xiling Shen (Department of Biomedical Engineering)*  
This project aims to characterize the metabolic, genetic, and epigenetic profiles of omental metastases and primary tumors from ovarian cancer patients, with the intention of identifying metabolic mechanisms necessary for successful metastatic seeding. I will use both bioinformatics analysis of publicly available datasets and profiling of available biospecimens obtained in collaboration with Dr. Ernst Lengyel at the University of Chicago. My analysis will focus on the role of the pentose phosphate pathway in maintaining redox homeostasis.
- ROTATION RESEARCH, DUKE UNIVERSITY SCHOOL OF MEDICINE** Durham, North Carolina  
**Exploring the Nutrient Availability in the Ovarian Tumor Microenvironment** 2018–2019  
*Principal Investigator: Dr. Jason Locasale (Department of Pharmacology and Cancer Biology)*  
Building on the expertise of the Locasale lab, I was trained to use liquid chromatography with tandem high resolution mass spectrometry (LC-HRMS) to characterize the metabolite profiles of various biospecimens including blood, peritoneal fluid, tumor samples, and cultured cells. My rotation project focused on profiling metabolites in ascitic fluid and using biostatistical models to characterize ovarian cancer cell uptake and metabolism of these nutrients.
- UNDERGRADUATE THESIS RESEARCH, HARVARD MEDICAL SCHOOL** Boston, Massachusetts  
**The True Powerhouse of the Cell: The Role of Neuronal Glycolysis in Acute Metabolic Stress During Glucose and Ketone Body Metabolism** (for partial fulfillment of honors B.A.) 2014–2016  
*Principal Investigator: Dr. Gary Yellen (Department of Neurobiology)*  
In this thesis work, I optimized and validated an experimental approach using concurrent expression of the genetically encoded, metabolic biosensors Perceval, an ATP:ADP ratiometric sensor, and pHRed, an intracellular pH sensor, in in vitro primary hippocampal neuron cultures. The flexibility of this model in allowing visualization of real-time, dynamic changes at the single cell level allowed us to (1) compare the modulation of acute metabolic stress responses with ketone body vs. glucose fuel sources, and (2) dissect glycolytic and oxidative phosphorylation pathways involved in acute metabolic stress responses. These experiments provide preliminary evidence to suggest that the metabolic responses of neurons to periods of acute stress are modulated differently by glucose and ketone body metabolism, and that glycolytic machinery serves as the major compensatory energy production pathway during these periods.
- JANELIA FARM RESEARCH UNDERGRADUATE SCHOLAR, HOWARD HUGHES MEDICAL INSTITUTE** Ashburn, Virginia  
**Investigating the Anatomical and Functional Role of Cholinergic Inputs to the Basilar Pontine Nucleus** 2014  
*Principal Investigator: Adam Hantman (Janelia Farm Research Campus)*  
Previous work has suggested the pedunculo pontine nucleus (PPN) may be a source of cholinergic input to the pons. Therefore, we set out to characterize the origin of this cholinergic input to the BPN using fluorescent label imaging and to investigate its function in a reach task behavior using optogenetic manipulation.
- SUMMER INTERNSHIP, NATIONAL INSTITUTES OF HEALTH** Bethesda, Maryland  
**A Phase II Trial for Newly Diagnosed Multiple Myeloma Using Carfilzomib, Revlimid, and Low-dose Dexamethasone** May 2012  
*Principal Investigator: Ola Landgren, National Cancer Institute (Bethesda, MD)*  
Working with the multiple myeloma treatment team at the NIH clinical center, I worked on characterizing vessel irritation following IV treatment, a common side effect found in patient on a novel combination therapy trial using carfilzomib, revlimid, and dexamethasone. Using statistical techniques and past patient histories in addition to survey data collected throughout the summer, we found changing the temperature of drug to be a significant controllable factor which impacted the severity of the vessel irritation.
- SUMMER INTERNSHIP, NATIONAL INSTITUTES OF HEALTH** Bethesda, Maryland  
**Cellular Localization of the ATP-Binding Cassette Transporter ABCB5 in Melanoma Cell Lines and its Potential Role as a Mitochondrial Transporter** May 2012  
*Principal Investigator: Dr. Michael Gottesman, National Cancer Institute (Bethesda, MD)*  
As a NIH summer intern working under the supervision of Dr. Jean-Pierre Gillet (Laboratory for Cell Biology — Multidrug Resistance Section), I worked on the localization of ABCB5, an ATP binding cassette transporter, using confocal microscopy and mitochondrial localization studies. We found ABCB5 localized in lysosomes and mitochondria, but not in the plasma membrane.
- SUMMER RESEARCH, UNIVERSITY OF NORTH TEXAS HEALTH SCIENCE CENTER** Fort Worth, Texas  
**Targeting AMP Kinase to Reverse Cisplatin Resistance in Ovarian Cancer Cells** 2010–2011  
*Principal Investigator: Dr. Alakananda Basu*  
Working with cisplatin sensitive and resistant ovarian cancer cell lines, we used Western blot procedures, immunological staining, and fluorescence activated cell sorting (FACS) to elucidate the extreme importance of AMP kinase in cisplatin resistance. This may be a potential therapeutic target in the future.

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## PUBLICATIONS

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- (1) **Bose, S.**, Clevers, H. and Shen, X., 2021. Promises and challenges of organoid-guided precision medicine. *Med*, 2(9), pp.1011-1026.
- (2) Sarvestani, S.K., DeHaan, R.K., Miller, P.G., **Bose, S.**, Shen, X., Shuler, M.L. and Huang, E.H., 2020. A tissue engineering approach to metastatic colon cancer. *iScience*, 23(11), p.101719.
- (3) Huang, Q., Garrett, A., **Bose, S.**, Blocker, S., Rios, A.C., Clevers, H. and Shen, X., 2021. The frontier of live tissue imaging across space and time. *Cell stem cell*, 28(4), pp.603-622.
- (4) Hurst, J.H., Heston, S.M., Chambers, H.N., Cunningham, H.M., Price, M.J., Suarez, L., Crew, C.G., **Bose, S.**, Aquino, J.N., Carr, S.T. and Griffin, S.M., 2021. Severe Acute Respiratory Syndrome Coronavirus 2 Infections Among Children in the Biospecimens from Respiratory Virus-Exposed Kids (BRAVE Kids) Study. *Clinical Infectious Diseases*, 73(9), pp.e2875-e2882.
- (5) Naqvi, I., Giroux, N., Olson, L., Morrison, S.A., Llanga, T., Akinade, T.O., Zhu, Y., Zhong, Y., **Bose, S.**, Arvai, S. and Abramson, K., 2022. DAMPs/PAMPs induce monocytic TLR activation and tolerance in COVID-19 patients; nucleic acid binding scavengers can counteract such TLR agonists. *Biomaterials*, p.121393.
- (6) Reid, M.A., **Bose, S.**, Pladna, K.M., Anderson, R., Mikhael, P.G., Xiao, Z., Dai, Z., Liu, S., Liu, J., Pardee, T. and Locasale, J.W., 2021. Predictive targeting of mitochondrial metabolism in Acute Myeloid Leukemia patients with a lipoic acid analog. *medRxiv*.
- (7) Sanderson, S. M., Xiao, Z., Wisdom, A.J., **Bose, S.**, Liberti, M.V., Reid, M. A., Hocke, E., Gregory, S.G., Kirsch, D.G., & Locasale, J.W. 2020. Digoxin Targets Central Carbon Metabolism and Remodels the Tumor Microenvironment. *bioRxiv (In Review)*
- (8) **Bose, S.**, Annamarie, A.E., & Locasale, J.W., 2020, The Molecular Link From Diet to Cancer Cell Metabolism. *Molecular Cell (currently in revisions)*.
- (9) **Bose, S.**, Ramesh, V., & Locasale, J. W., 2019. Acetate metabolism in physiology, cancer, and beyond. *Trends in Cell Biology*, 29(9), p.695-703.
- (10) **Bose, S.**, Robles, J., McCall, C.M., Lagoo, A.S., Wechsler, D.S., Schooler, G.R. and Van Mater, D., 2019. Favorable response to nivolumab in a young adult patient with metastatic histiocytic sarcoma. *Pediatric Blood & Cancer*, 66(1), p.e27491.
- (11) Basu, B., Jain, D., Kumar, N., Choudhury, P., Bose, A., **Bose, S.** and Bose, P., 2011. Processing, tensile, and fracture properties of injection molded Hdpe-Al2O3-HAp hybrid composites. *Journal of Applied Polymer Science*, 121(5), pp.2500-2511.

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## SELECTED PUBLIC APPEARANCES

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| 2022 <b>Speaker, SXSW Edu</b> (Austin, TX)<br>Speaker at Educational section of South by Southwest Festival in Austin, TX                                                                           | 2014 <b>Speaker, NCAA Final Four Innovation Summit</b> (Dallas, TX) Spoke at event tied to NCAA Final Four Basketball playoff games hosted by Turner Media                                                                                            |
| 2020 <b>Speaker, Ector County ISD</b> (Odessa, TX)<br>Spoke to ~750 students across the district about getting girls involved in STEM careers                                                       | 2013 <b>Panelist, Clinton Global Initiative University Opening Plenary Session</b> (Arizona State University, Phoenix, AZ)<br>On a panel with President Clinton, John McCain, and the founder of Wikipedia                                            |
| 2019 <b>Speaker, Horkest Congress</b> (Mexico City, Mexico)                                                                                                                                         | 2013 <b>Speaker, Youthecca Global Science Exhibition</b> (Seoul, South Korea) Spoke at exhibition for South Korean students doing various projects related to social entrepreneurship                                                                 |
| 2016 <b>Speaker, AIMS Conference</b> (Lisbon, Portugal)<br>Invited to speak at Annual International Medical Students Meeting about early science education                                          | 2012 <b>Speaker, TEDxGateway</b> (Mumbai, India) Invited to speak at independently organized TED event                                                                                                                                                |
| 2016 <b>Panel Discussion, Exponential Manufacturing Conference</b> (Boston, MA)                                                                                                                     | 2012 <b>Judge, Google Science Fair</b> (Mountain View, CA)                                                                                                                                                                                            |
| 2015 <b>Speaker, Genentech National Medical Meeting</b> (organized by USMA — Phoenix, AZ)<br>Speaker in session titled “Inventing the Inventor” at event for 200 Genentech employees and executives | 2012 <b>Keynote Speaker, UNTHSC Outreach Event</b> (Fort Worth, TX) Invited as keynote to speak to students in new UNTHSC’s outreach program, TABS (Texas Academy of Biomedical Sciences)                                                             |
| 2014 <b>Speaker, L’Oreal Inspiration Day</b> (New York City, NY)<br>Speaker and Panelist at event on the New World Stage for 400 L’Oreal brand executives                                           | 2012 <b>Invited to Second Annual White House Science Fair</b> (Washington D.C.) Mentioned by President Obama during National Medals of Science, Technology, and Innovation ceremony, selected to present research to esteemed guests such as Bill Nye |
| 2014 <b>Speaker, La Ciudad de Las Ideas</b> (Puebla, Mexico)<br>Speaker in Wunder 18 Session in event with theme “Change the World”                                                                 |                                                                                                                                                                                                                                                       |

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## OTHER SKILLS AND INTERESTS

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**Languages:** English (native), Bengali (fluent), Spanish (conversational), Hindi (limited working proficiency)

**Interests:** Graphic Design, Swimming, Crosswords, Running, Painting