

Curriculum Vitæ

Dr. Pranav Kumar Mishra

Post-Doctoral Research Fellow
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Rush University

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Education

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| 2020 | MBBS , Kasturba Medical College, Manipal, India |
| 2013 | BA in Biology , Washington University in St. Louis, USA |
| 2009 | EMT-B , College of DuPage, USA |

Professional Appointments

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| 2021 – Present | Post-Doctoral Research Fellow Laboratory of Anna Spagnoli, Department of Orthopedic Surgery Laboratory of Alfonso Torquati, Department of Surgery Laboratory of Susan Chubinskaya, Department of Pediatric Surgery (2021-2022) Rush University, USA |
| 2021 – 2021 | Junior Resident - Non-Academic Department of Surgical Oncology Kasturba Medical College, Manipal Manipal Academy of Higher Education, India |

Awards and Honors

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| 2022 | 1st Place - Elevator Speech Finalists' Competition - Rush Judges Award. Exploring novel hormones in the Bone-Fat-Insulin metabolism interface. Presented at the 2022 Rush University Trainee Research Day |
| 2022 | 3rd Place - Elevator Speech Finalists' Competition - Rush People's Choice Award. Exploring novel hormones in the Bone-Fat-Insulin metabolism interface. Presented at the 2022 Rush University Trainee Research Day |

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| 2020 | 3rd Place Oral Presentation – AAPI A deductive approach to modeling the spread of COVID-19. Presented at American Association of Physicians of Indian Origins Virtual Summit 2020 |
| 2013 – 2018 | First Class Honors at Kasturba Medical College, Manipal Medicine (with Psychiatry), Surgery (with Orthopedics), Pediatrics, Pathology, Microbiology, Pharmacology, Physiology, and Biochemistry |
| 2016 | 1st Place Oral Presentation - AFMC Invasive Rhabdomyosarcoma of the Nasopharynx and Cranium in a 21-year-old male. Presented at Illuminati, Armed Forces Medical College, Pune, India. |

Fellowships

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| 2021 – Present | Rush Public Voices Fellowship Full scholarship for the 40-member Rush cohort to the Op-Ed Project. The program provides instruction and mentorship towards publishing op-ed articles with the media |
| 2009 – 2009 | Summer Undergraduate Research Fellowship PI: Igor Efimov, Department of Biomedical Engineering, Washington University in St. Louis Funding: Howard Hughes Medical Institute and Imaging Sciences Pathways training grant Amount: \$ 3750 |

Postgraduate Training

Research

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| 2009 – 2013 | Project 1: Determine the mechanisms regulating the bone-fat-glucose interface PI: Anna Spagnoli, MD (Orthopedic Surgery); Alfonso Torquati, MD, MSCI (Surgery) Understand the role of sclerostin to metabolic, endocrine, and musculoskeletal health through a comparison between obese and non-obese individuals Creation of a biorepository and experimentation with gastrointestinal, adipose, and blood samples from Roux-en-Y gastric bypass patients and non-obese cadavers Clinical research coordination: recruitment and monitoring of patients in the study Clinical and research database creation and maintenance |
| 2021 – Present | Project 2: Role of IL-36RA in osteoarthritis and post-traumatic osteoarthritis PI: Anna Spagnoli, MD (Orthopedic Surgery); Susan Chubinskaya, PhD (Pediatrics) Determine the role of IL-36RA in mitigating factors of osteoarthritis (OA) and post-traumatic osteoarthritis (PTOA) Examining the augmentation of molecular and histological characteristics of impacted articular cartilage with IL-36RA Impaction-Bioreactor-Indentation tribology experimental model for mitigating mechanical stress on traumatically damaged cartilage with IL-36RA |

2021 – 2022

Project 3: Human cartilage tissue repository

PI: Susan Chubinskaya, PhD (Pediatrics) Intake and processing donated human cadaver specimens into the tissue repository

Dissection of en-bloc human legs for knee and ankle joints experiments, including articular cartilage, synovium, and synovial fluid

Grading degenerative morphological changes (DMC) to human articular cartilage

Multivariate and machine-learning models for clinical factors leading to DMC

National collaborations with tissue repository specimens

Clinical

2021

Junior Resident (Non-Academic) – Surgical Oncology – KMC, Manipal

Appointment with Dr. Naveen Kumar, Head of Department, Surgical Oncology

Intra-operative: first or second assist in open cases. Second assist in lap / VATS. 9 major surgeries per week.

In-patient pre-operative and post-operative management with 15 patients on service

Medical Experience

MBBS Internship

Role comparable to a US PGY-1 Transitional Year. Following the Final MBBS examinations, Indian doctors complete a “compulsory rotating internship”. Intern/house doctor in 11 departments, across primary, secondary, and tertiary care settings, treating patients speaking English, Hindi, and Kannada. Primary location: Kasturba Medical College, Manipal, KA, India

6 weeks

General Surgery

Kasturba Medical College, Manipal: Direct responsibility for 10 in-patients on service, ER call, out-patient clinic services

Intra-operative: first or second assist in open and laparoscopic general surgical cases

Jackson Park Hospital, Chicago, IL (Abroad rotation, 4 weeks)

4 weeks

Orthopedic Surgery

In-patient management on the spine service, directly responsible for 5-7 patients, trauma call, out-patient evaluation and follow-up

Second assistant in spine cases. First assist in trauma. Supervised with traction pinning.

6 weeks

Emergency Medicine (2 weeks mandated + 4 weeks additional elective)

Kasturba Medical College, Manipal: Level 1 trauma center. Lead physician for yellow and green zone. Assisted attendings with blue-zone critical, trauma, and ED-ICU patients

Jackson Park Hospital, Chicago, IL (Abroad rotation, additional 4 weeks)

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| 8 weeks | <p>Community Medicine (Preventative and Social Medicine)</p> <p>Preventative and social medicine: community surveillance of HIV, leprosy, tuberculosis, complications from diabetes</p> <p>Dr. TMA Pai Rotary Hospital, Karkala, KA (Remote rural secondary care hospital): in-patient, out-patient, and emergency department duty for pediatric, OB/Gyn, and adult emergent patients.</p> <p>Rural Primary Healthcare Centers (PHC) in Udupi District, KA: out-patient clinic, managing 5-10 adult patients per day in the capacity of a family medicine physician</p> |
| 8 weeks | <p>Obstetrics and Gynecology</p> <p>In-patient/out-patient management of 5-15 patients directly in services, including high-risk pregnancy, fetal medicine, oncology. Intra-op first or second assistant</p> <p>Labor Theater: conducted / assisted deliveries, monitored/augmented progress of labor</p> <p>Manipal Artificial Reproductive Centre: evaluated for causes of infertility, assisted in management via ovulation induction, IUI, IVF</p> |
| 10 weeks | <p>Internal Medicine (6 weeks mandated + 4 weeks additional research)</p> <p>In-patient management of 5-10 patients in ICU, step-down tele, and ward patients. Consult services and ER call duties. Out-patient adult clinic and university student clinic</p> <p>COVID-19 research during non-clinical lockdown rotation</p> |
| 4 weeks | <p>Psychiatry</p> <p>Streamwood Behavioral Healthcare System, Streamwood, IL, USA (Abroad rotation):</p> <p>In-patient child psychiatry, assisting attending with 15-20 acute patients</p> <p>Coordinated pharmacology, behavioral, family, and DCFS care</p> |
| 4 weeks | <p>Pediatrics</p> <p>In-patient management of 15-20 patients directly. PICU and Peds ER call duty.</p> <p>Out-patient evaluation, medication review, and vaccination</p> |
| 2 weeks | <p>Ear, Nose, Throat – Head and Neck Surgery</p> <p>In-patient and intra-operative management for 5 patients, assisting residents</p> <p>Outpatient clinic including diagnostic procedures EUM, VDL, audiometry</p> |
| 2 weeks | <p>Ophthalmology</p> <p>In-patient and intra-operative management for 5 patients, assisting residents</p> <p>Outpatient clinic, including assisting diagnostic and therapeutic procedures</p> |
| 2 weeks | <p>Anesthesiology</p> <p>Assisting residents and attendings with intra-operative management</p> <p>Critical care work for ventilator dependent ICU patients</p> |

Washington University Emergency Support Team (EST)



- 2009 – 2013 **Volunteer Emergency Medical Technician – Basic (EMT)**
EST responds to all EMS calls directed to the Washington University emergency dispatch center as the primary BLS team and provides large event stand-by coverage
2800+ hours of experience, with 2100+ hours as a senior EMT
- 2013 **Field Director (Chief Medic)**
Responsible for the oversight of 57 EMTs, selection, training, quality assurance
Coordinated with Medical Director (Alan Glass, MD) and Clayton Fire Department
- 2011 – 2012 **Assistant Field Director of New Medics**
Conducted internal training of first years
Coordinated with St. Louis Community College for EMT-B certification
Created “The Move-Up Guide” e-book containing 28 Standard Operating Protocols, 75 practical scenario questions, training advice, and mock call preparation
- 2011 – 2012 **Disaster Committee Co-Head**
Planned and executed annual mass-casualty disaster drills
Led meetings with university administration, police, and fire departments
- 2010 – 2011 **Public Relations Committee**
Improved awareness of common on-campus illnesses, when/how to call EST
Arranged First Aid/CPR classes for the St. Louis region
- 2010 – 2012 **Webmaster**
Helped develop and maintain est.wustl.edu using Drupal on an AMP stack

US Clinical Experience


- Aug 2022 **Emergency Medicine Elective**
Jackson Park Hospital and Medical Center; Chicago, IL, USA
- Jul 2022 **General Surgery Elective**
Jackson Park Hospital and Medical Center; Chicago, IL, USA
- Feb-Mar 2022 **Child Psychiatry - In-patient**
Streamwood Behavioral Healthcare System; Streamwood, IL, USA
- Jan 2017 **Neurosurgery Sub-Internship**
Pritzker School of Medicine, University of Chicago; Chicago, IL, USA

Publications

Pre-print

1. **Mishra, PK**, Mishra S. A deductive approach to modeling the spread of COVID-19. medRxiv.  
Published online January 1, 2020:2020.03.26.20044651. doi:[10.1101/2020.03.26.20044651](https://doi.org/10.1101/2020.03.26.20044651)

Oral Presentations



1. Esposito A, Wilson BM, Kluppel M, Meka SRK, **Mishra, PK**, Spagnoli A. CXCR4: A Key Axis in Mediating IGF-1 Signaling in Fracture Repair. Oral Presentation presented at: ORS ISFR 3-Minute Research Pitch Competition; April 2022.
2. **Mishra, PK**, Katrien C, Wilson BM, Meka SRK, Esposito A, Vidyani S, Kluppel M, Torquati A, and Spagnoli A. 2022. Exploring novel hormones in the Bone-Fat-Insulin metabolism interface. Elevator Speech Finalists' Competition. Poster Presentation. 2022 Rush University Trainee Research Day. Chicago, IL
3. Esposito A, Wilson BM, Kluppel M, Meka SRK, Suryadevara V, **Mishra, PK**, Corbeels K, and Spagnoli A. Critical Role of IGF1/CXCR4 Signaling in Regulating HIF1 α and HIF2 α Expression in Fracture Repair. Podium presentation at Spotlight Session presented at: Orthopedic Research Society 2022 Annual Meeting; February 2022; Tampa, Florida. <https://www.ors.org/Transactions/68/243.pdf> 
4. **Mishra, PK**, Mishra S. A deductive approach to modeling the spread of COVID-19. Oral Presentation presented at: Presented at American Association of Physicians of Indian Origins Virtual Summit 2020. June 27, 2020; Chicago, IL.

Poster Presentations

1. Corbeels K, Wilson BM, Meka SRK, Yu L, Esposito A, Suryadevara V, **Mishra, PK**, Kluppel M, Torquati A, and Spagnoli A. Bariatric surgery: a critical crossroad in the bone/glucose metabolism interface. Poster Presentation presented at: ASBMR 2022 Annual Meeting; September 2022; Austin, TX.
2. Esposito A, Kluppel M, Meka SRK, Wilson BM, **Mishra, PK**, Spagnoli A. Critical Role of IGF1/CXCR4/VEGF α Axis in Fracture Repair. Poster Presentation presented at: ASBMR 2022 Annual Meeting; September 2022; Austin, TX.
3. Esposito A, Kluppel M, Meka SRK, Wilson BM, **Mishra, PK**, Spagnoli A. Critical Role of IGF1/CXCR4/VEGF α Axis in Fracture Repair. Poster Presentation presented at: ORS ISFR 17th International Biennial Meeting; September 2022; Edinburgh, UK.
4. Esposito A, Kluppel M, Meka SRK, Wilson BM, **Mishra, PK**, and Spagnoli A. Critical Role of IGF1/CXCR4/VEGF α Axis in Fracture Repair. Poster Presentation presented at: RUSH Symposium; September 2021; Chicago, IL.

5. Suryadevara V, Meka SRK, Kluppel M, **Mishra, PK**, Corbeels K, Esposito A, Yu L, and Spagnoli A. HGC-curcumin nanoparticles for therapeutic intervention of osteoarthritis as seen by their regulation of chondrocyte biology. Poster Presentation presented at: RUSH Symposium; September 2021; Chicago, IL.
6. **Mishra, PK**, Lang D, Efimov I. Induction of ventricular fibrillation: the compensatory role of proline-rich tyrosine kinase 2 in hypertrophic mice hearts. Poster presentation presented at: Fall Undergraduate Research Symposium; 2010; St. Louis.

Software

1. **Mishra, PK**, Mishra S. COVID-19 Dashboard. Published online December 26, 2020.   doi:[10.5281/zenodo.4394300](https://doi.org/10.5281/zenodo.4394300)

Teaching Experience

St. Louis Community College - Forest Park

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| 2010 – 2013 | Adjunct Instructor - EMT-Basic Course Taught practical skills including ventilation, bleeding control, c-spine immobilization, extrication, cardiac arrest management, splinting Evaluated students in trauma/medical mock calls, per NREMT and Missouri standards |
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Licensures and Certifications

Licenses

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| 2020 – Present | Registered Medical Practitioner , Karnataka, India |
| 2018 – 2020 | Provisional Registration Certificate - Karnataka, India |
| 2009 – 2013 | EMT-Basic License - Illinois and Missouri |

Certifications

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| 2021 – 2024 | Biomedical Research - CITI Program |
| 2020 – 2022 | Advanced Cardiac Life Support - American Heart Association |
| 2020 – 2022 | Basic Life Support - American Heart Association |
| 2018 – Present | Basic Neonatal Resuscitation Program - Indian Academy of Pediatrics |
| 2009 – 2012 | EMT-Basic - National Registry of Emergency Medical Technicians |

External Funding Sources

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| 2021 – 2022 | DNA damage and cellular senescence in osteoarthritis pathophysiology NIH: R01 AG044034/AG/NIA PI: Richard F Loeser, Department of Medicine, University of North Carolina, Chapel Hill Sub-contract: Susan Chubinskaya, Department of Pediatric Surgery, Rush University Role: Pranav Mishra, human tissue procurement, morphological assessment, and processing |
| 2009 – 2009 | Summer Undergraduate Research Fellowship PI: Igor Efimov, Department of Biomedical Engineering, Washington University in St. Louis Funding: Howard Hughes Medical Institute and Imaging Sciences Pathways training grant Amount: \$ 3750 |

References

- [1] Corbeels K, Wilson BM, Meka SRK, Yu L, Esposito A, Suryadevara V, **Mishra PK**, Kluppel M, Torquati A, and Spagnoli A. 2022. Bariatric surgery: a critical crossroad in the bone/glucose metabolism interface. Poster Presentation. ASBMR 2022 Annual Meeting. Austin, TX.
- [2] Esposito A, Wilson BM, Kluppel M, Meka SRK, Suryadevara V, **Mishra PK**, Corbeels K, and Spagnoli A. 2022. Critical Role of IGF1/CXCR4 Signaling in Regulating HIF1 α and HIF2 α Expression in Fracture Repair. Podium presentation at Spotlight Session. Orthopedic Research Society 2022 Annual Meeting. Tampa, Florida. URL: <https://www.ors.org/Transactions/68/243.pdf>.
- [3] Esposito A, Kluppel M, Meka SRK, Wilson BM, **Mishra PK**, and Spagnoli A. 2022. Critical Role of IGF1/CXCR4/VEGF α Axis in Fracture Repair. Poster Presentation. ASBMR 2022 Annual Meeting. Austin, TX.
- [4] Esposito A, Kluppel M, Meka SRK, Wilson BM, **Mishra PK**, and Spagnoli A. 2022. Critical Role of IGF1/CXCR4/VEGF α Axis in Fracture Repair. Poster Presentation. ORS ISFR 17th International Biennial Meeting. Edinburgh, UK.
- [5] Esposito A, Wilson BM, Kluppel M, Meka SRK, **Mishra PK**, and Spagnoli A. 2022. CXCR4: A Key Axis in Mediating IGF-1 Signaling in Fracture Repair. Oral Presentation. ORS ISFR 3-Minute Research Pitch Competition.
- [6] **Mishra PK**, Katrien C, Wilson BM, Meka SRK, Esposito A, Vidyani S, Kluppel M, Torquati A, and Spagnoli A. 2022. Exploring novel hormones in the Bone-Fat-Insulin metabolism interface. Elevator Speech Finalists' Competition. Poster Presentation. 2022 Rush University Trainee Research Day. Chicago, IL.
- [7] Esposito A, Wilson BM, Kluppel M, Meka SRK, **Mishra PK**, Corbeels K, and Spagnoli A. 2021. Critical Role of IGF1/CXCR4/VEGF α Axis in Fracture Repair. Poster Presentation. RUSH Symposium. Chicago, IL.
- [8] Suryadevara V, Meka SRK, Kluppel M, **Mishra PK**, Corbeels K, Alessandra Esposito, Lily Yu, and Anna Spagnoli. 2021. HGC-curcumin nanoparticles for therapeutic intervention of osteoarthritis as seen by their regulation of chondrocyte biology. Poster Presentation. RUSH Symposium. Chicago, IL.
- [9] **Mishra PK** and Mishra S. 2020. A deductive approach to modeling the spread of COVID-19. medRxiv:2020.03.26.20044651.
- [10] **Mishra PK** and Mishra S. 2020. A deductive approach to modeling the spread of COVID-19. Oral Presentation. Presented at American Association of Physicians of Indian Origins Virtual Summit 2020. Chicago, IL.

- [11] **Mishra PK** and Mishra S. 2020. COVID-19 Dashboard.
- [12] **Mishra P**, Lang D, and Efimov I. 2010. Induction of ventricular fibrillation: the compensatory role of proline-rich tyrosine kinase 2 in hypertrophic mice hearts. Poster Presentation. Fall Undergraduate Research Symposium. St. Louis. URL: <https://rgdoi.net/10.13140/RG.2.2.29649.81764>.

Glossary

These are the meanings of the symbols used throughout this document:

- Ⓐ Indicates that a publication is open-access
- 🐙 Link to a code repository on GitHub
- 📄 Link to an open-access PDF, usually a preprint or postprint
- 📺 Link to a video on YouTube
- 📊 Link to a data archive
- 📽 Link to presentation slides
- 📋 Link to a poster