#### Curriculum Vitæ

# Dr. Pranav Kumar Mishra

Post-Doctoral Research Fellow
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Rush University

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United States

## Education

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**

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

2022	1ct Dlaco	Flavator	Speach	Finaliete'	Competition	_ Duch
2022	ist Place .	· Elevator :	Speecn	FIHAIISTS	combenuon	- Kusn

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

#### 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**

#### 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

### 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)

#### 8 weeks Community Medicine (Preventative and Social Medicine)

Preventative and social medicine: community surveillance of HIV, leprosy, tuberculosis, complications from diabetes

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.

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

#### 8 weeks **Obstetrics and Gynecology**

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

Labor Theater: conducted / assisted deliveries, monitored/augmented progress of labor Manipal Artificial Reproductive Centre: evaluated for causes of infertility, assisted in management via ovulation induction, IUI, IVF

#### 10 weeks Internal Medicine (6 weeks mandated + 4 weeks additional research)

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 COVID-19 research during non-clinical lockdown rotation

#### 4 weeks **Psychiatry**

Streamwood Behavioral Healthcare System, Streamwood, IL, USA (Abroad rotation): In-patient child psychiatry, assisting attending with 15-20 acute patients Coordinated pharmacology, behavioral, family, and DCFS care

#### 4 weeks **Pediatrics**

In-patient management of 15-20 patients directly. PICU and Peds ER call duty. Out-patient evaluation, medication review, and vaccination

#### 2 weeks Ear, Nose, Throat – Head and Neck Surgery

In-patient and intra-operative management for 5 patients, assisting residents Outpatient clinic including diagnostic procedures EUM, VDL, audiometry

## 2 weeks **Ophthalmology**

In-patient and intra-operative management for 5 patients, assisting residents Outpatient clinic, including assisting diagnostic and therapeutic procedures

#### 2 weeks **Anesthesiology**

Assisting residents and attendings with intra-operative management Critical care work for ventilator dependent ICU patients

## 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 and Mishra S. 2020. COVID-19 Dashboard 8 🔀

#### **Oral Presentations**

- 1. Esposito A, Wilson BM, Kluppel M **Mishra PK**, et al. 2022. CXCR4: A Key Axis in Mediating IGF-1 Signaling in Fracture Repair. Oral Presentation. ORS ISFR 3-Minute Research Pitch Competition
- 2. **Mishra PK**, Katrien C, Wilson BM, et al. 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 **Mishra PK**, et al. 2022. Critical Role of IGF1/CXCR4 Signaling in Regulating HIF1α and HIF2α 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
- 4. **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

#### **Poster Presentations**

- 1. Corbeels K, Wilson BM, Meka SRK **Mishra PK**, et al. 2022. Bariatric surgery: a critical crossroad in the bone/glucose metabolism interface. Poster Presentation. ASBMR 2022 Annual Meeting. Austin, TX
- 2. Esposito A, Kluppel M, Meka SRK **Mishra PK**, et al. 2022. Critical Role of IGF1/CXCR4/VEGFa Axis in Fracture Repair. Poster Presentation. ORS ISFR 17th International Biennial Meeting. Edinburgh, UK
- 3. Esposito A, Kluppel M, Meka SRK **Mishra PK**, et al. 2022. Critical Role of IGF1/CXCR4/VEGFa Axis in Fracture Repair. Poster Presentation. ASBMR 2022 Annual Meeting. Austin, TX
- 4. Esposito A, Wilson BM, Kluppel M **Mishra PK**, et al. 2021. Critical Role of IGF1/CXCR4/VEGFa Axis in Fracture Repair. Poster Presentation. RUSH Symposium. Chicago, IL
- 5. Suryadevara V, Meka SRK, Kluppel M **Mishra PK**, et al. 2021. HGC-curcumin nanoparticles for therapeutic intervention of osteoarthritis as seen by their regulation of chondrocyte biology. Poster Presentation. RUSH Symposium. Chicago, IL
- 6. **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

#### Software

1. **Mishra PK** and Mishra S. 2020. COVID-19 Dashboard

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# Teaching Experience

## St. Louis Community College - Forest Park

#### 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

## Patents and Trademarks

## Trademarks (India)

4979064 Balakrishnan P, **Mishra**, **PK**. PREPAREDx. 2021;(Class 42).

4979063 Balakrishnan P, **Mishra**, **PK**. PREPAREDx. 2021;(Class 9).

## Licensures and Certifications

## Licenses

2020 – Present **Registered Medical Practitioner**, Karnataka, India

2018 – 2020 **Provisional Registration Certificate** - Karnataka, India

2009 – 2013 **EMT-Basic License** - Illinois and Missouri

#### Certifications

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**

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, Kluppel M, Meka SRK, Wilson BM, **Mishra PK**, and Spagnoli A. 2022. Critical Role of IGF1/CXCR4/VEGFa Axis in Fracture Repair. Poster Presentation. ASBMR 2022 Annual Meeting. Austin, TX.
- [3] Esposito A, Kluppel M, Meka SRK, Wilson BM, **Mishra PK**, and Spagnoli A. 2022. Critical Role of IGF1/CXCR4/VEGFa Axis in Fracture Repair. Poster Presentation. ORS ISFR 17th International Biennial Meeting. Edinburgh, UK.
- [4] 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.
- [5] 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 HIF1α and HIF2α 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.
- [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/VEGFa 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.2.2.2.29649.81764.

# Glossary

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

- a Indicates that a publication is open-access
- C 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