

Aqib Rehman Magray

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2025-Present

Assistant Professor,
Department of Zoology,
University of Kashmir, Jammu and Kashmir, India, 190006

Education

2021. PhD in Zoology. University of Kashmir, India

2014. MSc in Zoology. University of Kashmir, India

2011. BSc in Zoology. Islamia College of Science and Commerce, India

Professional Experience

Feb 2023-today. **Postdoctoral Research Fellow.** Rosowski Lab, Clemson University, USA

Feb 2022 – Dec 2022. **Assistant Professor.** Central University of Kashmir, India

Jul 2021 – Dec 2021. **Lecturer.** Department of Higher Education, Jammu and Kashmir, India

2019 – 2020. **Robert S. McNamara Fellow.** Leibniz Institute for Farm Animal Biology (FBN), Germany

2017 – 2021. **Senior and Junior Research Fellow.** CSIR-UGC University Grants Commission (UGC), India

Scholarships and Awards

- **Robert S. McNamara Fellowship**, World Bank, USA (2019) – PhD research in Germany.
- **Graduate Fellowship**, University of Kashmir (2015-2017) – First Rank in PhD program.
- **CSIR-UGC NET-JRF Fellowship**, All India Rank 63 (2017) – Life Sciences.
- **CSIR-UGC Fellowship**, Junior (2018-2020) and Senior (2020-2021) Research Fellow.
- **Best Presentation Award**, 13th J & K Science Congress, University of Kashmir (2018).
- **Best Presentation Award**, Seminar on Climate Change, Islamia College (2010).

Travel Awards

- **DST-SERB Travel Grant**, Department of Science and Technology, India (2019) – EAFP conference, Porto, Portugal.
- **Partial Travel Grant**, University of Kashmir (2019) – EAFP conference, Porto, Portugal.

Reviewer Activity

- Journal Reviewer: *Frontiers in Cellular and Infection Microbiology*, *BMC Microbiology*.

Teaching Experience

Undergraduate

2021. Developmental Biology, Cell Biology, and General Zoology. Lecturer. Government Degree College, Ganderbal, India

2022. Evolution and General Parasitology. Assistant Professor. Central University of Kashmir,

India

- Delivered lectures on developmental biology, cell biology, and general zoology to undergraduate students, incorporating theoretical and practical components.

Graduate (Masters)

2024. Environmental Microbiology. Instructor. Senior Seminar, Clemson University, USA

- Taught Environmental Microbiology to senior seminar students, covering key concepts in microbiological processes affecting ecosystems and human health.

2022. Cell and Molecular Biology, Immunology, and Molecular Parasitology. Assistant Professor. Central University of Kashmir, India

- Taught Cell and Molecular Biology, Immunology, and Molecular Parasitology to undergraduate and postgraduate students. Also provided practical training in microscopy and molecular techniques.

Graduate (PhD)

2024. Readings in Evolution. Instructor. Graduate course, Department of Biological Sciences, Clemson University, USA

- Instructor for Readings in Evolution to graduate students, guiding literature review and discussions on evolutionary biology.

2024. Recent Advances in Microbiology Research. Instructor. Graduate course, Department of Biological Sciences, Clemson University, USA

- Course on research advances in microbiology focuses on the latest research developments and innovations in microbiology.

2022. Microscopy and Advanced Molecular Techniques. Assistant Professor. Department of Zoology, Central University of Kashmir, India

- Taught a graduate course on microscopy and advanced molecular techniques, providing both hands-on training and theoretical instruction on cutting-edge molecular biology research methods.

RESEARCH PUBLICATIONS:

- Hafeez, S., Yaqoob, S., **Magray, A. R.**, Kamili, A. N., & Ganai, B. A. (2023). Molecular characterization of fungal endophyte diversity isolated from *Aconitum heterophyllum*: a critically endangered medicinal plant of Kashmir Himalaya. *International Microbiology*, 1-12.
- Dar, Shoaib Ali, Ishtiyahq Ahmad, Imtiaz Ahmed, Harpreet Kaur, Saba Khursheed, Kamran Nisar, **Magray, A. R.**, and M. Z. Chishti. (2023) "Strategies for describing myxozoan pathogens, dreadful fish diseases in aquaculture." *Microbial Pathogenesis* (2023): 106512.
- **Magray, A. R.**, Ribera, J. M., Isernhagen, L., Galuska, S. P., Günther, J., Verleih, M., & Rebl, A. (2022). Evaluation of blood cell viability rate, gene expression, and O-GlcNAcylation profiles as indicative signatures for fungal stimulation of salmonid cell models. *Molecular immunology*, 142, 120-129.
- **Magray, A. R.**, Lone, S. A., Ganai, B. A., Ahmad, F., Hafeez, S., (2021). The first detection and *in vivo* pathogenicity characterization of *Saprolegnia delica* from Kashmir Himalayas. *Aquaculture*, 542, 736876.
- **Magray, A. R.**, Hafeez, S., Ganai, B. A., Lone, S. A., Dar, G. J., Ahmad, F., & Siriyappagouder, P. (2020) Study on pathogenicity and characterization of disease-causing fungal community associated with

cultured fish of Kashmir valley, India. *Microbial Pathogenesis*, 104715.

- **Magray, A. R.**, Ganai, B. A., & Ahmad, F. (2020). Isolation, identification, and pathogenicity patterns of *Mucor hiemalis* in cultured *Cyprinus carpio communis* using challenged system. *Aquaculture*, 518, 734837.
- **Magray, A. R.**, Lone, S. A., Ganai, B. A., Ahmad, F., Dar, G. J., Dar, J. S., & Rehman, S. (2019). Comprehensive, classical, and molecular characterization methods of *Saprolegnia* (Oomycota; Stramniopila), an important fungal pathogen of fish. *Fungal Biology Reviews*, 33(3-4), 166-179.
- Shabir, U., Ali, S., **Magray, A. R.**, Ganai, B. A., Firdous, P., Hassan, T., & Nazir, R. (2018). Fish antimicrobial peptides (AMP's) as essential and promising molecular therapeutic agents: a review. *Microbial pathogenesis*, 114, 50-56.
- **Magray, A. R.**, Tak, I., Tak, H., Ganai, B. A., Chishti, M. Z., Dar, J. S., and Ahmad, F., (2017). Abattoir Survey in Order to Ascertain the Prevalent Trematode Parasites of Cattle in North Kashmir. *Global Veterinaria*. gv18(2)17.
- Dar, J. S., Tak, I., Ganai, B. A., Shahardar, R. A., **Magray, A. R.**, and Tajamul, M., (2017). Evaluation of Immunoblotting Technique for the Diagnosis of Somatic Antigens of *Paramphistomum cervi* Isolated from Local Cattle Breeds of Kashmir Valley. *Global Veterinaria*. gv18(3)17.
- Tak, I., Ali, F., Dar, J. S., **Magray, A. R.**, Ganai, B. A., & Chishti, M. Z. (2019). Posttranslational Modifications of Proteins and their Role in Biological Processes and Associated Diseases. In *Protein Modificomics* (pp. 1-35). Academic Press.

RESEARCH EXPERIENCE:

Feb 2023 – Current:

In my current research role, I focus on investigating host-pathogen interactions and the innate immune response to infections, particularly with a specific emphasis on understanding the cellular and molecular mechanisms by which innate immune cells control fungal infections.

My primary model organism is the larval zebrafish. Currently, my research is centered around comprehending how the innate immune system functions to combat infections caused by the fungus *Aspergillus fumigatus*.

To conduct these studies, I employ the larval zebrafish as a host model due to its unique advantages, including high-resolution live imaging of infections in intact animals and advanced genetic tools such as CRISPR/Cas genome editing. These tools and techniques provide an unprecedented opportunity to delve into the intricacies of host-pathogen interactions and innate immune responses, ultimately contributing to the development of targeted interventions for infectious diseases in immunocompromised individuals.

Aug 2015- March 2021: Worked as a graduate student under the guidance of Prof. Bashir A. Ganai, Biochemistry Laboratories, Centre of Research for Development, University of Kashmir, on project “**Molecular Characterization of Disease-Causing Pathogenic Fungi and Antifungal Innate Immune resistance in Fish**”

My thesis work focused on characterization of the fungal diversity affecting cultured fisheries by employing microbiology and molecular characterization methods. The cultured fisheries are affected by a diverse group of fungal pathogens causing economic losses to the stakeholders. We have engaged experimental infection methods by

Susceptible Exposed Infective and Recovered (SEIR) models along with histopathological analysis for pathogenicity characterization. The outcome of the project was quite interesting and published successfully in some reputed journals (Microbial Pathogenesis and Aquaculture).

My recent project in Leibniz Institute for Farm Animal Biology (FBN), Dummerstorf, Germany was sponsored by World Bank under (Robert S. McNamara Fellowship program). The project was entitled "*Innate antifungal resistance: TLR-*IKK*-*NF- κ B* signaling pathway and antimicrobial peptide (AMP) expression analysis of fungal infected Rainbow trout fish models*". The study with Dr. Alexander Rebl, Fish genetics group, FBN involved investigating the innate immune markers in primary immune head kidney (HK) cells in salmonid (Rainbow trout) fish models and non-immune cells (CHSE-214 and RTgill-W1) against fungal PAMPs/pathogens. In particular we characterizing the differential expression of PRRs (TLRs, CLRs and NLRs) signaling pathways, associated cytosolic adaptors, and down regulative proinflammatory cytokines. We observed some key PRRs responsible for the sensing of fungal PAMPs/pathogens.

In yet another study at FBN with Dr. Sebastian Galuska, we explored the role of cell surface glycans and intracellular O-linked glycosylation (O-GlcNAc) in sensing and resistance of fungal PAMPs/pathogens.

During these five years of tenure of PhD, I was also actively involved in various collaborative projects in and outside the lab. In a study from our lab, we have isolated fungal pathogens from food items, characterized them and elucidated the toxicogenic potential of the fungal toxins in mice models.

TECHNICAL EXPERTISE:

Genome Editing: CRISPR/cas9 genome editing; tol2 transgenesis.

DNA/RNA Techniques: Isolation of genomic DNA, Primer design, PCR, Cloning of genes, Radioactive DNA labeling, Design and Synthesis of gRNA, plasmid synthesis, RFLP, Primer extension, Phylogenetics and Taxonomic characterization, Total RNA isolation, cDNA synthesis, RT-PCR and gene expression analysis by Real Time PCR, Microfluidic Quantitative PCR (MFQPCR) approach.

Protein and sugar Techniques: Protein purification, Chromatography-size exclusion, SDS- PAGE, native-PAGE, TLC, HPLC, ELISA, and Western blotting.

Biochemical techniques: Fungal metabolite extraction, Estimation of proteins, nucleic acids, UV-visible spectroscopy, spectrofluorimetric, Sugar and pH tests.

Cell and Microbial Culturing Techniques: Culturing and stimulation of primary head kidney (HK) cells, CHSE-214 and RTgill-W1, cell passaging, Fungal cultures, Strain maintenance, Antifungal tests, susceptibility and resistance tests, culturing fungal strains for experimental purposes, cell-fungi and fish host-fungi experimental infections (*In-vivo* and *In-vitro*).

Microscopic techniques: Confocal Microscopy, Fluorescent Microscopy, Light

Microscopy, Phase contrast Microscopy, Flow cytometry, Fungal staining, Histopathology and Scanning Electron Microscopy (SEM).

Software's and Programs: Image J, MEGA-7/X, Clustal W, Primer Design (Pyrosequencing Assay Design), (Light cycler 96 system), MFQPCR (Biomark/Fluidigm analysis), (R studio with CRAN and Bioconductor packages) and cystoscape packages.

CONFERENCES ATTENDED:

- Delivered an oral talk at a conference sponsored by Eukaryotic Pathogens Innovation Centre (EPIC), Clemson University on *Cell Biology of Eukaryotic Pathogens* (CBEP) 2023.
- Delivered an oral talk at **European Association of Fish Pathologists (EAFP)** sponsored, *19th International Conference Disease of Fish and Shellfish-2019*, Porto, Portugal
- Delivered a contributed talk in **13th J & K Science Congress**, Organized by University of Kashmir, during April 2nd to 4th, 2018.
- Delivered a contributed talk in **"Animal Science Congress"** 2018, University of Kashmir
- Participated in **104th Indian Science Congress**, held at Shri Venkateshwara University, Tirupati from January 3rd to 7th, 2017.
- Presented a paper in National Seminar on **"Himalayan Biodiversity Characterization and Bioprospection for Sustainable Utilization"**, organized by University of Kashmir, during 18th – 19th September 2017.
- Delivered a contributed talk in **11th J & K Science Congress**, Organized by University of Kashmir, during Oct 12- 14, 2015.

OTHER CONTRIBUTIONS:

- Worked as Teaching Assistant for SWAYAM sponsored Massive Online Open Course (MOOCs) Molecular Biology vide course No. 5065, offered on SWAYAM platform, India from 30-07-2018 to 20-10-2018.
- Delivered Services as Subject Expert/ Resource Person at EMMRC, University of Kashmir, in SWAYAM sponsored Massive Open Online Course (MOOC) in Molecular Biology, launched by MHRD, Government of India, (2018)
- Delivered Services as Subject Expert/ Resource Person at EMMRC, University of Kashmir in e- Content development Project, for Bio-Medical Sciences, (2016-2017)

Workshops and trainings:

- Completed a workshop about Digital Image Analysis with FIJI / ImageJ software sponsored by on Eukaryotic Pathogens Innovation Center and Clemson Light Imaging Facility on May 29-31, 2024.
- Completed the following CITI Program course, 2023
 - Basic Course for Research Investigators, Students and Animal Care Staff
 - General Zoonotic Training
 - Lab Animals
 - Working with Fish in Research Settings
- Completed a one credit course training on *Scientific Integrity and Research Ethics*, 2023,

Clemson University, SC, USA.

- Completed a workshop on advanced light microscopy, light cytometry, and image analysis, 2023 sponsored by the Clemson Light Imaging Facility, Clemson University, SC, USA.
- Completed RNAseq workshop, May 2023 sponsored by Clemson University Genomics and Bioinformatics Facilities, Clemson University, SC, USA.
- Participated in a workshop on “Animal welfare and animal testing with fish”-2020 GMA - Society for Marine Aquaculture at Busum, Germany.
- Participated in a workshop on “Histopathology” at EAAP conference-2019, Porto Portugal.
- Participated in One Week National Workshop on “*Genomics and Stem Cell Technologies in Animal Research and Production*” at SKUAST- K, from 17-24 July, 2017, sponsored by Science and Engineering Research Board, DST, Govt. of India.
- Participated in a 2-day workshop on “*Water Resources - Threats & Challenges: A way forward*”, on the eve of observance of World Water Day, 2017 (22 & 23 March, 2017), held at Department of Environmental Science, University of Kashmir, Srinagar.
- Participated in 5-day workshop on “*Scientific and Popular Writings: How to communicate results of research*” held at CORD, University of Kashmir, during September 16-20, 2017
- Participated in a 2-day National Seminar-cum-Workshop on “Skill Development in Biotechnology” 2016 organized by Department of Biotechnology & Bioinformatics, S.P. College, Cluster University, Srinagar.
- Participated a One Week Workshop on “*Research Methodology for Science Scholars/College & University Teachers*”, Organized by UGC-Human Resource Development Centre, University of Kashmir, during August 25th to 31st, 2015.

PERSONAL DETAILS:

Father's Name : Mr. Abdul Rehman
Magray Mother's Name : Ms. Shafiq Bano
Nationality : Indian
Date of Birth : 1st April 1991
Gender : Male
Marital Status : Married
Spouse : Sabira Hafeez
Languages Known : English, Urdu, Hindi and Kashmiri

Referees

- **Dr. Emily E Rosowski (Postdoctoral mentor)**
Assistant Professor
Biological Sciences, Clemson University, SC, USA
Phone: +1 8646565433
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- **Dr. Alexander Rebl (RSM project mentor)**
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Leibniz Institute for Farm Animal Biology
(FBN), Dummerstorf, Germany.
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- **Dr. Sebastian P. Galuska (RSM project mentor)**
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- **Prof. Bashir A Ganai (PhD thesis supervisor)**
Professor Biochemistry, Centre of Research for Development,
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- **Prof. Fayaz Ahmad (PhD thesis co-supervisor)**
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