

Hemal Naik

Researcher, Center of Advanced Collective Behavior Studies, Konstanz.

WORK EXPERIENCE

Max Planck Institute of Animal Behavior, Germany – PhD Candidate

Feb 2014 – Aug 2020

2nd Phase of PhD thesis. Applying industrial experience to solve problems in collective behavior studies. Involved in building a unique facility capable of tracking movements (3D, real-time) of multiple animals. Currently, developing machine learning based algorithms to compute 3D posture of birds from a monocular videos.

Extend3D GmbH, Munich, Germany — PhD Candidate

Feb 2014 – Nov 2016

1st phase of PhD thesis. Developed tracking algorithms for Augmented Reality (AR) and Computer Vision (CV) applications in manufacturing.

Extend3D GmbH, Munich, Germany — Software Dev.

Oct 2011 - Oct 2013 (Student Job)

Object tracking, 3D reconstruction, projector - camera calibration, marker based tracking.

L&T Integrated Engineering Solutions, India — Software developer

August 2008 - Aug 2010

Programming GUI, memory management for patient monitoring systems. Part of conflict management team.

EDUCATION

Technical University of Munich, Germany — Master of Science.

Oct 2010 - Oct 2013, Biomedical computing

Main subjects: Image processing, computer vision, augmented reality, linear algebra.

Mumbai University, India — Bachelor of Engineering

May 2004 - May 2008, Biomedical engineering

Main subjects: Human anatomy, digital signal processing, medical equipment design, programming, electronic design.

SKILLS

Technical expertise in augmented & virtual reality, computer vision, machine learning, and medical equipment design.

Programming expertise in C++, Python, and MATLAB.

Domain expertise in healthcare, industrial manufacturing, and behavioral biology.

Writing short stories, pop science articles, public talks and conducted birding walks for science outreach.

Networking and building strategic collaborations for migration studies in India with ICARUS project (2017-Present). **Representing MPIAB at Indo-German delegation going to India in Feb 2020.** Given talks at WII, IISc, Wildlife SOS, BNHS.

LANGUAGES

Gujarati, Hindi, Marathi, English, German (B1).

HOBBIES

Birdwatching, Hiking, Story writing and Percussion instruments.

INTERNSHIPS

TomTec Imaging systems, Germany — Jan 2010 – Oct 2010

Ultrasound image processing and 3D reconstruction.

NARVIS LAB at University hospital, Germany — Sep 2011 – Feb 2012

Developed calibration method for an Augmented Reality enabled C-Arm.

Breach Candy Hospital Trust, India — July 2007 – Dec 2007

Trainee at biomedical Dept. in the hospital, equipment management and repair.

PUBLICATION DETAILS

1. [In Prep] 3D Posture estimation of birds from monocular camera

Hemal Naik, Mate Nagy, Federico Tombari, Nassir Navab, Iain D Couzin.

2. [In Prep] Studying collective behavior of insects, birds and mammals in

large spaces, Mate Nagy, **Hemal Naik**, Jens Koblitz, Kano Fumihiro, Nora Carlson,

Martin Wikelski, Iain D Couzin. **Intended Venue: Nature Methods**

3. [Latest] Animals in Virtual Environments

Hemal Naik, Renaud Bastien, Nassir Navab, Iain D Couzin

2020 Accepted in IEEE Transactions on Visualization and Computer Graphics

4. Frustration Free Pose Computation For Spatial AR Devices in Industrial

Scenario Hemal Naik, Mahmoud Bahaa, Federico Tombari, Peter Keitler, Nassir Navab

2016 IEEE International Symposium on Mixed and Augmented Reality

5. Exploiting Photogrammetric Targets for Industrial AR

Hemal Naik, Yuji Oyamada, Peter Keitler, Nassir Navab

2015 IEEE International Symposium on Mixed and Augmented Reality.

6. A Step Closer to Reality: Closed Loop Dynamic Registration Correction

in SAR. Hemal Naik, Federico Tombari, Christoph Resch, Peter Keitler, Nassir Navab

2015 IEEE International Symposium on Mixed and Augmented Reality

7. DeepPoseKit, a software toolkit for fast and robust animal pose

estimation using deep learning JM Graving, D Chae, **Hemal Naik**, L Li, B Koger, B

Costelloe, Iain D Couzin , 2019 eLife

8. On-site semi-automatic calibration and registration of a projector-camera using arbitrary objects with known geometry

Christoph Resch, **Hemal Naik**, Peter Keitler, S Benkhardt, Gudrun Klinker

2015 IEEE Transactions on Visualization and Computer Graphics

9. Video-guided calibration of an augmented reality mobile C-arm

X Chen, **Hemal Naik**, Leijing Wang, Nassir Navab, Pascal Fallavollita

2014 International journal of computer assisted radiology and surgery

10. Turning birds into bats – Multimodal tracking to study collective

behavior JC Koblitz, O Frokosh, M Nagy, N Carlson, **Hemal Naik**, Iain D Couzin

2018 Journal of the Acoustic Society of America

OUTREACH DETAILS

Short Stories:

The meditating heron and Papa, can we have that?

Available on [Medium](#), [mindfulword](#)

Pop science articles:

Account of field excursions with various MPI researchers.

Available on: [Medium](#), [mindfulword](#)

Movies:

“Magic in Manipuri Sky” based on Amur Falcon conservation effort in North-East India. Displayed in public school in Manipur, India and University of Konstanz.

Available on [Youtube](#) and [Maxcine](#).

Public Talk:

Explained ICARUS project and significance of migration studies to non-scientific audience at a [climate care festival](#) in Berlin.

Birding Walk:

Conducted birding walk and interactive discussions with students of Architecture faculty [Animalesque](#) workshop in Berlin.