Arkadeep Narayan Chaudhury

https://arkadeepnc.github.io
LinkedIn, GitHub
ResearchGate

Email: arkadeec@alumni.cmu.edu
Cell: +1 412-626-4231
5703 Pocusset St.
Pittsburgh, PA, ZIP: 15217

Education

Carnegie Mellon University, Robotics Institute — Pittsburgh, PA, USA
PhD in Robotics (Computer Science) — *Aug. 2018 – October 2024*

Indian Institute of Science — Bangalore, Karnataka, India
Master of Science in Mechanical Engineering — *Aug. 2015 – Dec. 2017*

Indian Institute of Engineering Science and Technology — Shibpur, West Bengal India
Bachelor of Engineering in Mechanical Engineering — *Jul. 2011 – May 2015*

Research Experience

3D capture and reconstruction systems, sensor fusion, photometric stereo, prototyping low-level computer vision systems, Computer Vision accelerators, Robotics: manipulation and tactile sensing.

Experience

Epic Games, Inc. — Pittsburgh, PA
Research Scientist — *Nov. 2024 – present*

Responsibilities: Developing next-generation human capture systems with a focus on engineering, research, and dissemination through academic publications.

Toyota Research Institute — Los Altos, CA
Research Scientist Intern — *May. 2023 – Aug. 2023*

Physically based 3D representations: Researched algorithms on physically based capture of 3D assets for robotics. Developed a robot mounted multi-flash stereo camera rig to capture multi-modal data from small objects in bounded scenes. [Patent filed. App. no.: 63/553727]

Atkeson Lab, CMU RI — Pittsburgh, PA
Graduate Research Assistant — *Nov. 2019 – Oct 2024*
Doctoral thesis: Moving Lights and Cameras for Better 3D Perception of Indoor Scenes

Moving cameras: Developed an ensemble of collocated vision, depth and touch sensors and a set of algorithms to visually servo robots to workspace goals and localize objects through vision and touch. ICRA & RA-L'22

Moving lights: Designed and implemented a robot workspace scale photometric stereo setup for object agnostic, surface texture, surface orientation, and surface deformation perception. WACV'24

Moving lights and cameras: Designed and implemented a portable multi-flash stereo camera for appearance and geometry perception of small scenes. Project

Robotics and Design Lab, IISc — Bangalore, India
Graduate Research Assistant — *Jul. 2015 - Dec. 2017*
Advisor: Prof. Ashitava Ghosal

Design of Parallel Robots: Designed Monte Carlo simulations to model workspaces of parallel robots. Modeled the human 3-fingered grasp and proposed techniques for optimal design of parallel robots. Thesis, MMT, JMR.

Selected Course Projects

Planning on Manifolds: Devised algorithms for path planning of collaborative robot arms to manipulate ultra-sound probes on a human body phantom. This algorithm was later used to research automatic femoral artery catheterization. [Video]

SLAM for Legged Robots: Used GTSAM and OpenCV to co-develop a framework for visual state estimation in legged robots using their gait information. [Report]

Latest Publications. [Google Scholar Page]

[1] **Chaudhury, A. N.**, Vasiljevic I., Zakharov S., Guizilini V., Ambrus R., Narasimhan S., Atkeson C. (2024) "Incorporating dense depth into neural 3D representations for view synthesis and relighting" *Proc. of the 3DV '25* Link, arXiv

[2] **Chaudhury, A. N.**, Vasiljevic I., Zakharov S., Guizilini V., Ambrus R., Narasimhan S., Atkeson C. (2024) "A Multi-flash Stereo Camera for Photo-realistic Capture of Small Scenes" *SIGGRAPH Asia 2024 Technical Communications* Link

[3] **Chaudhury, A. N.**, Keselman, L. & Atkeson, C. (2024) "Shape from Shading for Robotic Manipulation" *Proc. of the WACV '24* Link

[4] **Chaudhury, A. N.**, Man, T. Yuan, W. & Atkeson, C. (2022) "Using Collocated Vision and Tactile Sensors for Visual Servoing and Localization." *IEEE RA-L & ICRA 2022* Link

[5] Ashwin K.P.*, **Chaudhury A.N.***, and Ashitava Ghosal. (2020) "Efficient representation of ducts and cluttered spaces for realistic motion planning of hyper-redundant robots through confined paths."J. Computer-Aided Design, 119, 102777. Link [*: equal contribution]

[6] **Chaudhury, A. N.**, & Ghosal, A. (2017). "Optimum design of multi-degree-of-freedom closed-loop mechanisms and parallel manipulators for a prescribed workspace using Monte Carlo method". Mechanism and Machine Theory, 118, 115-138. Link

Patents

[1] **Chaudhury, A. N.**, Vasiljevic I., Zakharov S., Guizilini V., Ambrus R., Narasimhan S., Atkeson C. (2024) "Multi-flash stereo camera for photorealistic capture of small scenes" *US Patent Application no.: 63/553727, Filed on Feb. 15, 2024*

Skills

Programming Languages: Python, C++, CUDA, Cython

Robot platforms: Universal Robots UR5, Franka Emika FR3, XArm-7

Computing Environments: Linux [Ubuntu]

Machine Learning Toolboxes: PyTorch, TensorFlow, SciKit-Learn

Software Libraries: ROS, OpenCV, PCL, GTSAM

Languages: English (full proficiency), Bengali (native proficiency) and Hindi (bi-lingual proficiency)

Relevant Courses

At CMU: Computer Vision, Geometric Methods in Computer Vision, Advanced Nonlinear Control Theory, Robot Mapping and Localization, Linear Systems, Statistical Techniques in Robotics, Deep Reinforcement Learning, Machine Learning

At IISc: Robotics (Kinematics, Dynamics and Control), Numerical Linear Algebra, Geometric Modelling, Linear and Non-Linear Optimization,

Awards and Service

DST-SERB Overseas PhD fellowship (Govt. of India) [Declined]	08/2018 – 08/2023
Graduate Research Fellowship (CMU)	08/2018 – 08/2019
DST Graduate Scholarship (Govt. of India)	08/2015 – 12/2017

Reviewer for WACV, 3DV, ICRA, IEEE Sensors, IEEE-RA-L, Elsevier CAD, Elsevier MMT, and ASME JMR.

References

Prof. Christopher G. Atkeson Professor, CMU, cga@cmu.edu [PhD advisor]

Prof. Ashitava Ghosal Professor, IISc Bangalore. asitava@iisc.ac.in [M.Sc. advisor]

Dr. Iain Matthews Director, Research Science at Epic Games, iain.matthews@epicgames.com [Manager]