

# Md Maklachur Rahman

Final Year PhD Student in Computer Science  
Texas A&M University, College Station, TX, USA  
U.S. Permanent Resident

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[Google Scholar](#) | [LinkedIn](#) | [GitHub](#) | [Portfolio](#)

## EDUCATION

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### Texas A&M University (TAMU)

PhD in Computer Science | *Expected Spring 2027*  
CGPA: 4.0/4.0

College Station, TX, USA

Jan 2022–Present

### Kyungpook National University (KNU)

MS in Computer Science & Engineering  
*Outstanding MS Thesis Award - 2020*

Daegu, South Korea

Sep 2018–Aug 2020

## MANUSCRIPTS UNDER REVIEW

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1. **Md Maklachur Rahman** and Tracy Hammond. “Dual-Domain Cross-Modal Decoding for Clinical Text-Guided Medical Image Segmentation.” Under review at the *29th International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI 2026)*.
2. **Md Maklachur Rahman**, Md Hasan Al Banna, and Tracy Hammond. “GET: Generative Embedding Translation for Medical Image Segmentation.” Under review at the *29th International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI 2026)*.
3. **Md Maklachur Rahman**, Soon Ki Jung, and Tracy Hammond. “An Ultra-Lightweight U-Net for Skin Lesion Segmentation under Dataset Shift with Inference Scaling.” Under review at *International Journal of Computer Vision (IJCV)*. Extended journal version of the BMVC 2025 paper.

## SELECTED PUBLICATIONS

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1. **Md Maklachur Rahman**, Soon Ki Jung, and Tracy Hammond. “MambaLiteUNet: Cross-Gated Adaptive Feature Fusion for Robust Skin Lesion Segmentation.” In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2026)*.
2. **Md Maklachur Rahman**, Soon Ki Jung, and Tracy Hammond. “AULUNet: An Adaptive Ultra-Lightweight U-Net Framework for Efficient Skin Lesion Segmentation in Resource-Constrained Environments.” In *The 36th British Machine Vision Conference (BMVC 2025)*, **Oral**, Top 3%.
3. Meet Arvindbhai Monpara, **Md Maklachur Rahman**, Tauhidul Alam, Jiangjiang Liu, and Jing Zhang. “Stranded Human Detection in Flooded Environments From UAV Imagery.” In *2025 International Conference on Robotic Computing and Communication (RoboticCC 2025)*.
4. **Md Maklachur Rahman**, Abdullah Aman Tutul, Ankur Nath, Lamyamba Laishram, Soon Ki Jung, and Tracy Hammond. “Mamba in Vision: A Comprehensive Survey of Techniques and Applications.” arXiv preprint, 2024.
5. Deblina Mazumder Setu, Tania Islam, **Md Maklachur Rahman**, and Samrat Kumar Dey. “Towards Enhancing Healthcare Data Privacy: Integrating BioClinicalBERT With Polyalphabetic Cipher for Entity Recognition and Anonymization.” *Engineering Reports*, 8(3), 2026.
6. **Md Maklachur Rahman**. “Target Focused Shallow Transformer Framework for Efficient Visual Tracking.” In *Doctoral Consortium of the 38th AAI Conference on Artificial Intelligence (AAAI 2024)*, Vancouver, Canada.
7. **Md Maklachur Rahman** and Tracy Hammond. “Learning Random Noise Salient Feature Fusion Siamese Network for Low-Resolution Object Tracking.” In *Student Abstract and Poster Program of the 38th AAI Conference on Artificial Intelligence (AAAI 2024)*, Vancouver, Canada.
8. **Md Maklachur Rahman** and Soon Ki Jung. “Siamese-Based Attention Learning Networks for Robust Visual Object Tracking.” In *Visual Object Tracking in Challenging Situations*. IntechOpen, 2022. **[Book Chapter]**

9. **Md Maklachur Rahman**, Md Rishad Ahmed, Lamyamba Laishram, Seock Ho Kim, and Soon Ki Jung. “Siamese High-Level Feature Refine Network for Visual Object Tracking.” *Electronics*, 2020.
10. **Md Maklachur Rahman**, Mustansar Fiaz, and Soon Ki Jung. “Efficient Visual Tracking with Stacked Channel-Spatial Attention Learning.” *IEEE Access*, 2020.
11. Mustansar Fiaz, **Md Maklachur Rahman**, Arif Mahmood, Sehar Shahzad Farooq, Ki Yeol Baek, and Soon Ki Jung. “Adaptive Feature Selection Siamese Networks for Visual Tracking.” In *26th International Workshop on Frontiers of Computer Vision (IW-FCV 2020)*, Ibusuki, Japan. **Oral. [Best Student Paper Award]**

Full publication list: [Google Scholar](#)

## RESEARCH AND PROFESSIONAL EXPERIENCE

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**Sketch Recognition Lab**, Texas A&M University College Station, TX, USA  
 Graduate Research Assistant / PhD Student Jan 2022–Present

- Conduct research in medical image segmentation, computer vision, efficient and lightweight AI, and multimodal learning, with current work spanning text-guided, generative, and skin lesion segmentation.
- Develop compact segmentation frameworks for robust medical image analysis under dataset shift and limited-compute settings, leading to publications in CVPR 2026 and BMVC 2025, with ongoing work in clinical text-guided and generative segmentation.
- Mentor BS, MS, and junior PhD students on several research projects, including medical imaging, segmentation, and computer vision.

**Center for Embedded Software Technology**, Kyungpook National University Daegu, South Korea  
 Researcher Sep 2021–Dec 2021

- Developed an edge-oriented traffic perception pipeline for vehicle and pedestrian detection, tracking, and counting from intersection-camera imagery.
- Estimated position and velocity for two target classes across roadway, sidewalk, and crosswalk regions to support practical traffic-monitoring applications.

**Visual AI Lab**, Kyungpook National University Daegu, South Korea  
 Research Assistant Sep 2018–Aug 2020  
 Researcher Sep 2020–Aug 2021

- Developed Siamese, attention, and sequence-modeling-based frameworks for robust visual object tracking under different challenges, such as occlusion, appearance variation, deformation, scaling, and background clutter.
- Contributed to tracking systems published in IEEE Access, Electronics, and IW-FCV, with emphasis on target discrimination and real-time-friendly inference.

**Samsung Research Bangladesh**, Samsung Electronics Dhaka, Bangladesh  
 Software Engineer Oct 2013–Jul 2016

- Worked on software validation, verification, and automation in an industrial R&D environment.
- Contributed to Tizen IDE verification and IoT/SWC/DMC test framework development to improve repeatability, reliability, and efficiency in system-level quality assurance.

## TEACHING EXPERIENCE

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**Texas A&M University** College Station, TX, USA  
 Graduate Teaching Assistant | Programming Languages (CSCE 314) Jan 2024–Present

- Supported instruction in Haskell and Java for an upper-level programming languages course.
- Designed and managed grading workflows and score distributions for quizzes, assignments, and exams.
- Held office hours and guided students on course concepts, debugging, and programming assignments.

## HONORS AND AWARDS

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- CVPR Broadening Participation Award, CVPR 2026 Apr 2026
- Outstanding Reviewer, BMVC 2025 Nov 2025
- TAMU CS Department Travel Grant Nov 2025; June 2026
- IEFS Graduate Scholarship, TAMU Aug 2025
- AAAI 2024 Travel Award Feb 2024
- Outstanding MS Thesis Award, KNU Aug 2020
- Best Student Paper Award, IW-FCV 2020 Feb 2020
- Brain Korea 21 Plus (BK21) Scholarship Sep 2018 – Aug 2020
- KNU International Graduate Scholarship (Full KINGS) Sep 2018 – Aug 2020
- University Merit Scholarship, CUET Mar 2009 – Sep 2013

## PROFESSIONAL SERVICE

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- **Conference Reviewer:** NeurIPS, CVPR, ECCV, AAAI, WACV, BMVC, Graphics Interface
- **Journal Reviewer:** Pattern Recognition, Pattern Recognition Letters, Computers in Human Behavior, Displays, Electronics, Entropy, IEEE Access, Neurocomputing

## SELECTED PROJECTS

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- **Post-Training for Segmentation Output Refinement** [Mar 2026–Present]  
Developing segmentation-specific post-training strategies using GRPO- and DSO-style preference optimization to select and refine correct masks from ambiguous candidate generations, targeting more accurate and clinically reliable final segmentations.  
**Methods & Skills:** Post-Training, GRPO, DSO, Reinforcement Learning, Preference Optimization, Medical Image Segmentation.
- **Parameter-Efficient Fine-Tuning for Language-Guided Medical Segmentation** [Jan 2026–Present]  
Developed a LoRA-based PEFT framework for clinical text-guided medical image segmentation, reducing trainable parameters by 83.9% (47.77M → 7.68M) and GFLOPs by 62.8% (20.31G → 7.55G), achieving 90.94 Dice / 83.38 mIoU on QaTa-COV19 and 81.71 Dice / 69.08 mIoU on MosMedData+, within 0.52 Dice / 0.88 mIoU and 0.24 Dice / 0.34 mIoU of the full DD-CMD baseline (MICCAI 2026 submitted).  
**Methods & Skills:** LoRA/PEFT, Vision-Language Models, Multimodal Learning, Medical Image Segmentation.
- **Vision-Language Modeling for Medical Image Segmentation** [Oct 2025–Present]  
Developed a clinical text-guided segmentation framework integrating spatial cross-attention and frequency-aware text modulation, improving performance by 1.96 Dice and 2.67 mIoU over the strongest baselines on QaTa-COV19 and MosMedData+.  
**Methods & Skills:** PyTorch, Vision-Language Models, Multimodal Learning, Medical Image Segmentation.
- **Generative Modeling for Medical Image Segmentation** [Apr 2025–Present]  
Developed a lightweight latent-to-latent generative segmentation framework with 1.07M trainable parameters, outperforming GMS by 0.93 Dice, 1.26 IoU, and 0.81 px HD95, with an additional 3.51 Dice gain on BUS/BUSI cross-domain evaluation.  
**Methods & Skills:** PyTorch, Generative Modeling, Semantic Segmentation, Diffusion/VAE-Based Representation.
- **Ultra-Lightweight Architectures for Medical Image Segmentation** [Mar 2024–Present]  
Designed efficient segmentation architectures for resource-constrained skin lesion analysis, producing AULUNet and MambaLiteUNet with up to 85.32% mIoU / 92.08% DSC on ISIC2017 using only 0.029M parameters and 0.069 GFLOPs, and 93.09% average Dice across four dermoscopy benchmarks.  
**Methods & Skills:** PyTorch, Efficient AI, Deep Learning, Semantic Segmentation.
- **Efficient Visual Object Tracking under Challenging Conditions** [Mar 2019–Feb 2024]  
Developed Siamese-, attention-, and sequence-modeling-based tracking frameworks for robust target tracking under occlusion, appearance change, deformation, and background clutter, evaluated on OTB50/100, VOT2017, VOT2018, TC-128, and UAV123.  
**Methods & Skills:** PyTorch, Siamese Tracking, Attention Mechanisms, Visual Object Tracking.

- **Edge-Based Traffic Object Detection and Motion Estimation** [Sep 2021–Dec 2021]  
Developed an edge-oriented traffic perception pipeline for vehicle and pedestrian detection, tracking, and motion estimation from intersection-camera imagery, supporting position and velocity estimation across roadway, sidewalk, and crosswalk regions.  
**Methods & Skills:** Edge AI, Object Detection, Object and Lane Tracking.

## STUDENT MENTORING

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- **Current and Recent Student Mentoring**

- **Group Mentoring**, Sketch Recognition Lab (SRL), TAMU, Jan. 2026–Present.
  - \* **Group 1**, Nitya Khurana, Harrison Li, Yuqing Cao, and Ayaan Budhwani. Topic: Gender Bias in AI Models.
  - \* **Group 2**, Fawwaz Memon, Nethum Weerasinghe, Armaan Khatwani, and Vidhu Karthik. Topic: Segment Anything Model (SAM) for Medical Image Segmentation.
  - \* **Group 3**, Kaarthi Vedere, Ore Olayinka, Rivan Adhikari, and Rohan Doshi. Topic: Cross-Modality Translation (CT-to-MRI Generation).
- **Rachit Patel**, BS in CS, TAMU, Sep. 2025–Present. Topic: Efficient Architectures for Medical Image Analysis.
- **Phillip Ronin**, BS in CS, TAMU, Sep. 2025–Dec. 2025. Topic: Early-stage Guidance in ML, DL, and CV for Real-world Projects.
- **Sayok Bose**, BS in CS, TAMU, Sep. 2025–Dec. 2025. Topic: Deep Learning Architectures for Medical Image Segmentation.
- **Arunima Chowdhury**, MS in CS, TAMU, May. 2025–Dec. 2025. Topic: Transformer-based Models for Polyp Segmentation.
- **Ashwin Parameswaran**, BS in CS, TAMU, Jun. 2024–Oct. 2025. Topic: Polyp Segmentation with Boundary-aware Feature Extraction.

- **Mentoring with Publication Outcomes**

- **Hemish Radadiya**, MS in CS, Lamar University, Co-mentoring, Jul. 2025–Dec. 2025. Outcomes: *IEEE COINS*.
- **Deblina Mazumder Setu**, MS in CS, University of Barishal, Bangladesh, Co-mentoring, 2024–2026. Outcomes: *Engineering Reports* (2026), *Franklin Open* (2025), and *IEEE ICCIT* (2024).
- **Meet Arvindbhai Monpara**, MS in CS, Lamar University, Co-mentoring, Jul. 2025–Dec. 2025. Outcome: *RoboticCC* (2025).
- **Afrin Hayat**, BS in CS, University of Barishal, Bangladesh, Co-mentoring, 2024. Outcome: *IEEE ICCIT* (2024).
- **Abhyudaya Singh Tak**, Visual AI Lab, Kyungpook National University, South Korea, Co-mentoring, 2022. Outcome: *MITA* (2022).