# ROBIK SHRESTHA

(585)-766-5549 | robikshrestha@gmail.com | robikshrestha.com | github.com/erobic | linkedin.com/in/robikshrestha

***A Ph.D. candidate with publications on scrutinizing and improving robustness of deep learning systems. Seeking research positions for computer vision/natural language processing/scalable and trustworthy AI.***

**Research Interests:** Deep Learning, Bias-Resilience, Vision/Vision+Language and Continual Learning

## WORK AND RESEARCH EXPERIENCE

**Ph.D. Candidate,** Rochester Institute of Technology — Aug 2017 – Present

- Revealed several failure modes of state-of-the-art deep learning systems: they can be *right for the wrong reasons* and fail on multiple types/levels of distribution shifts. Proposed simpler techniques that match/outperform SoTA methods.
- Developed *OccamNets*: architectures that favor simpler solutions to improve robustness. Showed improvements in bias-resistance by 8-18% and inference-time efficiency by 50% on biased vision datasets.
- Developed *REMIND*, a model based on hippocampal indexing theory to enable *online lifelong learning*. It replays compressed memories to improve accuracy by 25-50%, preventing catastrophic forgetting observed in prior methods.
- Developed *RAMEN*, a Visual Question Answering system that generalizes to *natural and synthetic domains,* unlike previous VQA models.

---

**Research Intern,** Adobe Inc — May - Oct 2021

- Improved sensitivity of vision and language embeddings to *fine-grained concepts* using *contrastive learning methods* with algebraic constraints.
- Tested fine-grained concept sensitivity by collecting *image-text pairs with small conceptual differences.*
- **Team:** Dr. Kushal Kafle, Dr. Scott Cohen, Dr. Zhe Lin

---

**Research Assistant,** ITEL Laboratories — Jul 2018 - Mar 2021

- Built a *floor material classification system* to enable semi-automated insurance claims processing. Helped move from a manual system to a system that processes 85% of the images automatically.
- Enhanced robustness by improving *bias-resilience*, *model calibration* and *out-of-distribution detection*
- The project partially funded my Ph.D. research at RIT.

---

**Software Engineer,** Viveka Health — Feb 2014 - Apr 2016

- As a first hire for this startup, I helped develop a *fraud detection engine* for U.S. health insurance claims that saved *$1M+* for *25K+ lives* through various employers and payers.
- Was involved in building the team by interviewing and hiring personnel and designing+implementing the full stack: cleaning up/loading data to add new clients, implementing fraud, waste, abuse detection engine, and designing UI + reports

---

**Software Engineer,** Yomari Incorporated — Nov 2012 - Feb 2014

- Developed *business intelligence solutions,* including ETL scripts and analytics reports for Nepal Telecom and international retailers.

## PUBLICATIONS

1. **Robik Shrestha,** Kushal Kafle, Christopher Kanan. "OccamNets: Mitigating Dataset Bias by Favoring Simpler Hypotheses." *European Conference on Computer Vision (2022)* *(Oral Presentation, Top 2.7%)*

---

2. **Robik Shrestha,** Kushal Kafle, Christopher Kanan. "An investigation of critical issues in bias mitigation techniques." *IEEE/CVF Winter Conference of Applications on Computer Vision* (2022)

---

3. Usman Mahmood, **Robik Shrestha** et al. "Detecting Spurious Correlations With Sanity Tests for Artificial Intelligence Guided Radiology Systems." *Frontiers in Digital Health (2022)*

---

4. Damien Teney, Kushal Kafle, **Robik Shrestha** et al. "On the Value of Out-of-Distribution Testing: An Example of Goodhart's Law." *Neural Information Processing Systems (2020)*

---

5. Tyler Hayes*, Kushal Kafle*, **Robik Shrestha***, Manoj Acharya and Christopher Kanan. "REMIND Your Neural Network to Prevent Catastrophic Forgetting." *European Conference on Computer Vision* (2020). (* = equal contributions)

---

6. **Robik Shrestha,** Kushal Kafle, and Christopher Kanan. "A negative case analysis of visual grounding methods for VQA."

*Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics* (2020).

7. Kushal Kafle, **Robik Shrestha**, and Christopher Kanan "Answering questions about data visualizations using efficient bimodal fusion." *The IEEE Winter Conference on Applications of Computer Vision* (2020).

8. **Robik Shrestha**, Kushal Kafle, and Christopher Kanan. "Answer them all! toward universal visual question answering models." *Proceedings of the IEEE conference on computer vision and pattern recognition* (2019).

9. Kushal Kafle, **Robik Shrestha**, and Christopher Kanan. "Challenges and prospects in vision and language research." *Frontiers in Artificial Intelligence* (2019).

## INVITED TALKS AND GUEST LECTURES

- "**Dataset Bias in Vision and Language Tasks: Problems and Potential Solutions**" for *Center for Human Aware AI (CHAI)*, Rochester, NY (Fall 2021)
- "**An Introduction to Bias Mitigation Techniques**" for the *Deep Learning course taught by Dr. Christopher Kanan*, RIT, (Spring 2020 and 2021)

## ACADEMIC DUTIES

- **Reviewer:** ICLR (2022), TMLR (2022), NeurIPS (2022), AAAI (2019/20), EMNLP (2019/20), EACL (2020), NLE (2020), ICSVT (2020)
- **Teaching Assistant:** Taught and assessed graduate students for the course of *MultiView Geometry* taught by Dr. Guoyu Lu

## TECHNICAL SKILLS

- **Languages:** Python, Javascript, Shell Scripting
- **Frameworks/Tools:** PyTorch, Pytorch-Lightning, Scipy, Pandas
- **Others:** AWS, MTurk, D3.js, Git, Past: JS, Java

## EDUCATION

**Ph.D. in IMAGING SCIENCE** **Aug 2017 - Current**
Chester F. Carlson Center for Imaging Science, RIT, Rochester Institute of Technology
**Relevant Courses:** Deep Learning Systems for Vision; Image Processing and Computer Vision; Human Visual System; Principles of Statistical Data Mining;
**Advisor:** Dr. Christopher Kanan | **Research Group:** kLab

**B.E. in COMPUTER ENGINEERING** **Oct 2008 - Dec 2012**
Institute of Engineering, Tribhuvan University, Nepal
Full Merit-Based Scholarship, Obtained 1st rank
**Relevant Courses:** Image Processing and Pattern Recognition, Artificial Intelligence