M Charity
AI and Game Design PhD Candidate
mlc761@nyu.edu - https://mastermilkx.github.io/

Education

New York University - Tandon School of Engineering — Brooklyn, NY
PhD, Game Design and Artificial Intelligence, GPA 3.63/4.00 — expected 2024

Virginia Commonwealth University — Richmond, VA
BS, Computer Science with minor in Mathematics, GPA 3.81/4.00 — May 2019

- 2019 College of Engineering Outstanding Student Award
- 2018 Wright Access Scholarship Recipient
- 2017 and 2018 EDU Tech Scholarship Recipient
- 2016 Provost Scholarship Recipient

Deep Run High School - Center for Information Technology — Glen Allen, VA
High School Diploma, GPA 4.94/4.00 — June 2016

- 2015 NCWIT National Aspiring Award Winner
- 2014 NCWIT Regional Aspiring Award Winner

Research Experience

New York University - Tandon School of Engineering — Brooklyn, NY
PhD Researcher — September 2019 - present

- Studying game design and artificial intelligence under Dr. Julian Togelius
- Designed, implemented, and deployed crowd-sourced mixed-initiative level designer
- Helped develop Sims simulator framework for generating and populating novel houses
- Developed quality-diversity system for creating levels with specific mechanic features
- Helped develop game agents implementing GPT-2 transformer to play the word game Codenames
- Developed the learning framework for and hosted the Keke AI competition
- Developed, launched, and maintained the aesthetic learning Twitter bot

Virginia Commonwealth University — Richmond, VA
Unity Programmer MCV moVR - Virtual Reality Physical Therapy Lab — Jan 2019 - Aug 2019

- Built 5-game virtual reality game suite for fibromyalgia patients (Build-A-Bot)
- Prototyped HTC Vive full-body motion capture system for animation
- Built pain rating system for viewing work-effort of physical activities
- Built card matching VR game for fibromyalgia patients
- Prototyped pain categorization and selection VR system

Natural Language Processing Undergraduate Researcher — Jun 2016 - Jan 2019

- Developed named-entity recognition system for drug occurrences
- Integrated interface for SemMed Database
- Helped develop literature based discovery neural network
- Developed latent semantic analysis system for doctor-patient interaction

University of Minnesota - Twin Cities — Minneapolis, MN
NSF Big Data REU Researcher — Jun 2018 - Aug 2018

- Worked in Dr. Victoria Interrante's virtual reality lab
- Designed and implemented a novel locomotion VR system
- Ran a user-based experiment with 10 participants for the performance of the system

Leadership/Teamwork Experience

EXAG 2021
Co-organizer for EXAG 2021 — Virtual

- Helped organize and host the 2021 Experimental AI in Games Workshop at AIIDE 2021 — Mar 2021 - Oct 2021
- Maintained and updated the EXAG.org website

- Put together the Call for Papers, arranged presentation schedule, and recruited reviewers

Virginia Commonwealth University Richmond, VA
Computer Science Student Advisory Board member May 2018 - May 2019
- Communicated with both students and professors about state of the department
- Volunteer as ambassador at College of Engineering open houses
- Promote student-led social clubs and extracurricular activities

FRC Team 1086 - Blue Cheese Glen Allen, VA
Lead Programmer May 2013 - Jul 2015
- Programmed team's competition robot in C++ for FRC season

FTC Captain Jul 2015 - Feb 2016
- Captain of the FTC division of Blue Cheese - Team 93 Blue Cheese Jr.

Deep Run High School Glen Allen, VA
Leader of Computer Club Game Design Division Oct 2012 - May 2015
- Founder and leader of the game design division
- Organized and managed game development within sub-teams

CyberPatriot Oct 2012 - May 2015
- JV Captain (freshman and sophomore year)
- Veteran member of all-girls team (junior year)

Technical Work Experience

LAIKA Team
Research Consultant Contractor Copenhagen, Denmark (Remote)
- Researched and developed the Character Creator tool for the startup company LAIKA May 2022 - Aug 2022
- Researched up-and-coming NLP technologies to implement in the LAIKA product

New York University
Teaching Assistant Brooklyn, NY
- Teaching assistant for CS-GY (Artificial Intelligence, AI for Games, and Game Design) Aug 2020 - May 2022
- Graded projects and tutored during office hours

Virginia Commonwealth University Richmond, VA
Teaching Assistant - CMSC 257 Aug 2018 - May 2019
- Teaching assistant grading projects, aiding with lab assignments, and tutoring during office hours

CodeVA Richmond, VA
Teaching Assistant - Game Design Summer Camp Aug 2015 - Sep 2015
- Assisted with teaching Scratch and game development to elementary school children

University of Richmond Richmond, VA
Web Services Intern Jun 2015 - Aug 2015
- Intern to the back-end web services team monitoring statistics for web traffic

Talks

PWLConf 2022 St. Louis, MO
- Invited speaker for the Papers We Love conference in St Louis, Missouri Sept 2022
- Talk Title: 3CG: Collaborative and Creative Content Generation in Game Design

Technical Skills

Programming Languages
- Javascript, Python, PHP, MySQL, C#, C++, C, Java, Perl

Software, game engines, and operating systems
- HTML5, PICO-8, Unity, Google Sheets, git, jupyter-notebook, unix, MACOS, Windows

Publications

- **Charity, M.,** Green, M. C., Khalifa, A., & Togelius, J. (2020, September). Mech-elites: Illuminating the mechanic space of gvg-ai. In International Conference on the Foundations of Digital Games (pp. 1-10).
- **Charity, M.,** Khalifa, A., & Togelius, J. (2020). Baba is Y'all: Collaborative Mixed-Initiative Level Design. 2020 IEEE Conference on Games (CoG), 542-549.
- **Charity, M**., D. Rajesh, R. Ombok, and L. B. Soros. "Say 'Sul Sul!' to SimSim, A Sims-Inspired Platform for Sandbox Game AI". *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, vol. 16, no. 1, Oct. 2020, pp. 182-8, https://ojs.aaai.org/index.php/AIIDE/article/view/7428.
- Jaramillo, C., **M. Charity**, R. Canaan, and J. Togelius. "Word Autobots: Using Transformers for Word Association in the Game Codenames". *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, vol. 16, no. 1, Oct. 2020, pp. 231-7, https://ojs.aaai.org/index.php/AIIDE/article/view/7435.
- Green, M. C., Khalifa, A., **Charity, M**., Bhaumik, D., & Togelius, J. (2022). Predicting Personas Using Mechanic Frequencies and Game State Traces. arXiv preprint arXiv:2203.13351.
- **Charity, M**., Memon, N., Jiang, Z., Sen, A., & Togelius, J. (2022, September). Diversity and Novelty MasterPrints: Generating Multiple DeepMasterPrints for Increased User Coverage. In 2022 International Conference of the Biometrics Special Interest Group (BIOSIG) (pp. 1-4). IEEE.
- **Charity, M**., & Togelius, J. (2022, August). Keke AI Competition: Solving puzzle levels in a dynamically changing mechanic space. In 2022 IEEE Conference on Games (CoG) (pp. 570-575). IEEE.
- **Charity, M**., & Togelius, J. (2022). Aesthetic Bot: Interactively Evolving Game Maps on Twitter. *arXiv preprint arXiv:2208.05017*.
- Green, M. C., Khalifa, A., **Charity, M**., & Togelius, J. (2022). Persona-driven Dominant/Submissive Map (PDSM) Generation for Tutorials. arXiv preprint arXiv:2204.05217.