SASHA AZAD

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My dissertation conceptualises and designs a taxonomy and an associated social simulation authoring tool. My work allows both novice and experienced social simulation scientists to model and simulate a large population of agents with their behaviour, emotions, knowledge, relationships and overall social state. I posit my work would allow scientists to easily reproduce and evaluate existing models, collaborate on standards and methodologies developed for new techniques, and allow for a more rigorous model-to-model analysis.

EDUCATION

Ph.D. COMPUTER SCIENCE — **Aug '17 - present**
North Carolina State University | Specialization: Narrative and Game Artificial Intelligence.

M.S. COMPUTER SCIENCE — **May '16**
Georgia Institute of Technology | Specialization: Interactive Intelligence.

B.E. COMPUTER ENGINEERING — **May '11**
University of Mumbai | *Specialization:* *Artificial Intelligence & Soft Computing.*

WORK EXPERIENCE

RESEARCH INTERN: Future of Work - Safer Workplaces Group — **May '22 - Aug '22**
IBM Research - Almaden Labs | *Managers: Ed Seabolt, Vandana Mukherjee*
Designed and developed a simulation that modelled the spread of COVID-19 amongst employees in a workplace using artificial intelligence and agent simulation techniques with the goal to mitigate viral spread. Was able to model a digital twin of all employees of a specific workplace while remaining privacy preserving. Simulated a workplace, taking into account location and interaction constraints, real world resource bottlenecks and their effect on the spread of virus. Modelled a SEIR model to describe the diffusion of virus while analysing the effect of various risk-reducing policies that could be enforced ***[In progress: 2 papers + 1 patent]***

GRADUATE RESEARCH ASSISTANT: Principles of Expressive Machines (POEM) Lab — **Aug '17 - current**
North Carolina State University | *Advisor: Dr. Chris Martens*
Modeling believable social agents that take into account cognitive science, narrative intelligence, and social science theories to support applications ranging from entertainment to the study of social science. **[Paper: J1,C6,C4,W2-5]**

RESEARCH LAB ASSOCIATE INTERN: Narrative Intelligence Group — **Sep '16 - Jun '17**
Disney Research, Pittsburgh | *Advisor: Dr. Albert "Boyang" Li*
Research into the creation and scheduling of an interactive multiplayer alternate reality experiences. I tackled the largely overlooked problem of computational scheduling taking into account temporal uncertainty. **[Paper: C3, C5]**

GRADUATE RESEARCH ASSISTANT: Campus APIs & Mobility Group — **Jan '15 - May '16**
Research Networks & Operations Center, Georgia Institute of Technology | *Advisor: Dr. Russ Clark & Dr. Matt Sanders*
Worked with campus research groups to open data, facilitate student innovation, and develop new modes of interaction. Worked with students harnessing the APIs created from project conception to entrepreneurial launches.

ENTREPRENEURIAL LEAD: Design & Intelligence Lab — **May '15 - Dec '15**
National Science Foundation (NSF) iCorps Grant Recipient | *Principal Investigator: Dr. Ashok Goel*
R&D for a knowledge extraction tool that is capable of extracting deep understanding from text to improve the precision, relevance and fertility of retrieved knowledge using direct matching & analogical reasoning. **[Paper: C1]**

CONSULTANT: Global Mobile Applications Team — **Aug '12 - Jun '14**
Capgemini India Pvt. Ltd. | *Software Engineer('12), Senior Software Engineer('13), Consultant('13)*
Developed several web and hybrid mobile applications for iOS & Android devices. Designed mobile applications that allowed for consumer & enterprise clients to access and monitor enterprise data.

APPLICATION ANALYST: Global Mobility Group **Jun '11 - Aug '12**

Bayer Business Services Pvt. Ltd. *| Software Engineer('11), Application Analyst ('12)*

Initiated the first mobile development team in Bayer. Developed and deployed interactive Enterprise & Consumer mobile applications. Worked primarily on Sencha Touch, Objective C, Augmented Reality.

PUBLICATIONS

REFEREED JOURNAL PAPERS

J1: Azad, Sasha, and Chris Martens. "Little Computer People: A Survey and Taxonomy of Simulated Models of Social Interaction." ACM SIGCHI CHI Play, In the Proceedings of the ACM on Human-Computer Interaction (PACMHCI) Journal. 2021.

REFEREED CONFERENCE PAPERS

C6: Sasha Azad, Jennifer Wellnitz, Luis Garcia and Chris Martens. "Anthology: A Social Simulation Framework" In *The AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE). 2022.*

C5: Striner, Alina, **Sasha Azad**, and Chris Martens. "A Spectrum of Audience Interactivity for Entertainment Domains" In *International Conference on Interactive Digital Storytelling (ICIDS).* 2019. ***(Best Paper award!)***

C4: Azad, Sasha, and Chris Martens. "Lyra: Simulating Believable Opinionated Virtual Characters." *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment. Vol. 15. No. 1.* 2019.

C3: Azad, Sasha, Jingyang Xu, Haining Yu, and Boyang Li. "Scheduling Live Interactive Narratives with Mixed-Integer Linear Programming." *The 13th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE).* 2017.

C2: Azad, Sasha, Carl Saldanha, Cheng Hann Gan, Mark O. Riedl, "Procedural Level Generation for Augmented Reality Games." *Twelfth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*. 2016.

C1: Spencer Rugaber, Shruti Bhati, Vedanuj Goswami, Evangelia Spiliopoulou, **Sasha Azad,** Sridevi Koushik, Rishikesh Kulkarni, Mithun Kumble, Sriya Sarathy, Ashok K. Goel. "Knowledge Extraction and Annotation for Cross-Domain Textual Case-Based Reasoning in Biologically Inspired Design." ICCBR 2016: 342-355

REFEREED WORKSHOP PAPERS

W5: Lech, Brenden, **Sasha Azad,** Jennifer Welnitz, Joel Jonasson and Chris Martens, "Designing a Combined World and Story Procedural Content Generation Engine." *Experimental AI in Games Workshop, In the Proceedings of the 17th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE).* 2021

W4: Jonasson, Joel, **Sasha Azad,** Brenden Lech, and Chris Martens, "Defining Approaches to Creating a Story-Generation Engine." *Experimental AI in Games Workshop, In the Proceedings of the 17th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE).* 2021

W3: Martens, Chris, Owais Iqbal, **Sasha Azad,** Maddie Ingling, Anthony Mosolf, Emma McCamey, and Johanna Timmer. "Villanelle: Towards Authorable Autonomous Characters in Interactive Narrative." 2018. In *Intelligent Narrative Technologies and Workshop on Intelligent Cinematography and Editing, The 14th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*. 2018.

W2: Azad, Sasha, and Chris Martens. "Addressing the Elephant in the Room: Opinionated Virtual Characters." *Experimental AI in Games Workshop, In the Proceedings of the 14th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*. 2018.

W1: Azad, Sasha, Carl Saldanha, Cheng Hann Gan, Mark O. Riedl "Mixed Reality Meets Procedural Content Generation in Video Games." *Experimental AI in Games Workshop, Twelfth Artificial Intelligence and Interactive Digital Entertainment Conference*. 2016.

REFEREED POSTER PAPERS

P1: Azad, Sasha, 2018, September, "Towards Generating Narratives for the Real World." *The Proceedings of the 14th AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE)*. 2018.

HIGHLIGHTED RESEARCH

TOPIC: BELIEVABLE VIRTUAL AGENTS

Social Intelligence and Believable Social Characters: Principles of Expressive Machines (POEM) Lab **Sep '17 - current**

Advisor: Dr. Chris Martens. **Description:** My dissertation conceptualises a taxonomy that classifies virtual character interactions by their social behaviours, inter-agent communication, knowledge, and relationships. I am currently designing and evaluating a framework based on this taxonomy. I posit my work would allow scientists to reproduce and evaluate existing models, collaborate on standards, allow for better communication and methodologies developed for new techniques, and allow for a more rigorous model-to-model analysis. ***[Paper: J1]***

Dynamic Opinion Propagation in Virtual Characters: Principles of Expressive Machines (POEM) Lab **Sep '17 - Jun '18**

Advisor: Dr. Chris Martens. **Description:** Investigating the problem of group formations, and group opinion and belief modeling for a society of virtual characters that are able to form, discuss and exchange their views on topics. Considers the effects of real (eg., book clubs, classmates, etc) and virtual (eg. news and media sources, etc) communities and membership on NPC opinions and behaviours. ***[Paper: C4, W2]***

Multiplayer AI Narrative & Quest Generator (AI Storytelling in Virtual Worlds course): **Sep '14 - Dec '14**

Developed a Python AI Simulator that used Planning techniques to generate a murder mystery narrative (with simulated motives) for a set of virtual characters. The AI Game Master controlled when to divulge clues & plot-lines to players. A quest generator was created to improve gameplay.

Jill - An Intelligent Research Assistant (Computational Creativity course): **Feb '15 - May '15**

Developed an interactive concept search engine using IBM Watson and Python that could comb through scientific papers and journals to aid the literature review process. The engine also tracked the cognitive research thought process of the user.

Intelligent Self Learning Conversational Agent (Bachelor's Thesis): **Aug '10 - May '11**

Developed an AI Chatterbot that expanded its knowledge base from user interaction and the internet using case-based reasoning and semantic frames.

TOPIC: GAME AND NARRATIVE INTELLIGENCE FOR AR/MR

Scheduling Narratives in Mixed Reality: Disney Research, Pittsburgh **Sep '16 - May '17**

Advisor: Dr. Boyang Li. **Description:** Investigating the scheduling of a multiplayer interactive narrative, which handles reasoning under temporal uncertainty, resource scheduling, and non-linear plot choices. We present a mixed-integer linear programming formulation of the problem and empirically evaluates its scalability over large narrative instances, with the aim to inform the control and generation of the narrative. ***[Paper: C3]***

Augmented Reality Procedural Content Generation *(MS Project)***:** Entertainment Intelligence Lab **Sep '15 - May '16**

Advisor: Dr. Mark Riedl. **Description:** Designed and developed an augmented reality interactive experience that responds to real time changes in the environment, as well as player mobility constraints. The interaction scans the room using a Kinect and performs surface detection, using a combination of Game AI, Player Modeling and PCG to dynamically generate levels for the AR Super Mario Bros and Lemmings game. ***[Paper: C2, W1]***

Creation of a Player-Centric Dynamic Game AI (Artificial Intelligence course): **Mar '14 - May '14**

Developed an AI gameplay agent to play the Isolation board game on an 8×8 grid. The agent used player modeling and clustering to judge the personality type and skill level of the human player and make moves to match the player's characterisation. Implemented a Random Walk Minimax with Alpha Beta.

TOPIC: USER INTERACTION

Cognopsi - A Knowledge Extraction Tool: Design Intelligence Lab **Aug '15 - Jan '16**

Research and development on a knowledge extraction tool that extracts deep understanding from text to improve the precision, relevance and fertility of retrieved responses by direct matching & analogical reasoning. ***[Paper: C1]***

Characterising the Marvel Comic Universe (Information Visualisation course): **Sep '15 - Dec '15**

Designed an interactive visualisation in D3 for Marvel comic book enthusiasts and aggregate media analysts to explore the vast variety of Marvel characters, their relationships with one another and to their universe. Was selected to be included in the Georgia Tech 2015 College of Computing Gift Guide.

Unlock the Box (Independent - Civic Engagement Domain): **Oct ’15 - May '16**

Developed an API to improve voter turnout and encourage civic participation. Targeted the rising American electorate who comprise of 62% of the voting age population in Georgia yet only 53% of registered voters. Worked with the New Georgia Project’s Director to implement the Voting API for the State of Georgia.

Bayer Eco Commercial Building App (Bayer - Mobile Information Visualisation): **Oct ’11 - Jan ‘12**

Developed backend in Java/JSP to collect real-time data from an energy efficient building. Created interactive charts to visualise the data on an iPad interface. Won many accolades at the Global Mobility Conference in Leverkusen

HONOURS AND AWARDS

Selected for Women In Games International (WIGI) - Mentorship Program	**2022**
Google Women Techmakers (formerly Anita Borg) Scholarship	**2020**
Society of Women Engineers (SWE) Scholarship - Motorola Solutions Foundation Engineering Scholarship	**2020**
Girls Make Games (GMG) Fellowship	**2020**
Best paper award - International Conference on Interactive Digital Storytelling (ICIDS)	**2019**
NC State University Graduate Fellowships	**2017**
Senator of the Year - Georgia Tech Grad Student Government Association	**2016**
National Science Foundation (NSF) iCorps Grant Recipient and Entrepreneurial Lead	**2015**
Rookie Senator of the Year - Georgia Tech Grad Student Government Association	**2015**

ACADEMIC SERVICE AND INVOLVEMENT

SELECT CONFERENCE / WORKSHOP ORGANISATION

PC Co-Publicity Chair: AAAI Conference on Artificial Intelligence in Digital Entertainment (AIIDE)	**2022**
Co-Chair: AAAI AIIDE Experimental AI in Games Workshop	**2020**
PC Co-Publicity Chair: AAAI Conference on Artificial Intelligence in Digital Entertainment (AIIDE)	**2019**

SELECT PROGRAM COMMITTEE AND REVIEWING MEMBERSHIP

IEEE Conference on Games (CoG)	**2020**
AAAI AIIDE Intelligent Narrative Workshop	**2020**
International Conference on Interactive Digital Storytelling (ICIDS)	**2019-2020**
AAAI Conference on Artificial Intelligence in Digital Entertainment (AIIDE)	**2017-2020**
IEEE Conference on Computational Intelligence and Games (CIG)	**2019**
AAAI Workshop on Knowledge Extraction from Games	**2019**
FDG Workshop on Procedural Content Generation (PCG)	**2019**
AAAI AIIDE Experimental AI in Games Workshop (EXAG)	**2017-19**

LEADERSHIP EXPERIENCE

NORTH CAROLINA STATE UNIVERSITY

PhD Recruitment Coordinator, Dept. of Computer Science	**2017 - present**
Strategic Planning Committee, Dept. of Computer Science	**2017 - present**

GEORGIA INSTITUTE OF TECHNOLOGY

Executive Legislature, Graduate Student Government Association	**2015 - 2016**
Senator, College of Computing, Graduate Student Government Association	**2014 - 2016**
Team Leader, CRIDC (Career, Research & Innovation Development Conference) Committee	**2014**

AT THE WORKPLACE

Chief Editor, Capgemini monthly Newsletter, BayCap Beacon	**2012 - 2014**
Delivered the keynote presentation at the One Year Capgemini-Bayer merger	**2014**

UNDERGRADUATE LEVEL

Elected Chairperson, Computer Society of India, Fr. CRCE **2009 - 2011**

Editor-in-Chief, One of 5 students chosen nation-wide as Editor for Computer Society of India Magazine **2010**

Chair, Organising Committee, for Computer Society of India, National Convention 2 years running **2010 - 2011**

OUTREACH AND MENTORING

NORTH CAROLINA, USA

Mentor, 3 undergraduate CS students at NC State University conducting research in the intelligent narrative field.

Volunteer, SPARCS (Students in Programming, Robotics and Computer Science) is a middle school outreach program where students are taught computer science concepts. Lessons include game design using Kodu, algorithms, web design, robotics with LEGO Mindstorms, and interactive narrative authoring Twine.

Volunteer, Second Chance Pet Adoptions (local animal shelter)

GEORGIA, USA

Volunteer, Fulton County Animal Services

Volunteer, Fulton County Library

MAHARASHTRA, INDIA

Volunteer, P.A.W.S. Animal Shelter, Mumbai

Volunteer, Dr. Sarala's Special Care Unit for Senior Citizens, Mumbai

PRESS

Characterising the Marvel Comic Universe project featured on Georgia Tech's GVU website **2016**

Characterising the Marvel Comic Universe project featured on Georgia Tech's 2015 Holiday Gift Guide **2016**

NSF I-Corps customer discovery results featured on the Georgia Tech College of Computing website **2015**