

# Henry Kudzanai Dambanemuya

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## EDUCATION

**Northwestern University** Evanston, IL 2018 – Present  
Ph.D., M.Sc. Technology & Social Behaviour  
Joint Program in Computer Science & Communication Studies | GPA: 4.00  
Advisor: Emőke-Ágnes Horvát

**University of Notre Dame** Notre Dame, IN May 2017  
M.A. International Peace Studies, Kroc Institute for International Peace Studies | GPA: 3.89

**DePauw University** Greencastle, IN May 2013  
B.A. Computer Science & Conflict Studies, Honor Scholar Program | GPA: 3.25

**Selected Coursework:** Data Science; Machine Learning; Complex Network Analysis; Agent-Based Modelling; Algorithms & Data Structures; Design & Analysis of Algorithms; Computational Discrete Mathematics; Foundations of Computation; Computer Systems; Databases & File Systems; Programming Languages; Dynamic Programming; Statistics and Statistical Programming; Web Science & Information Retrieval; Social Sensing & Cyber-Physical Systems; Mind, Intelligence & Machines; Human-Computer Interaction; Object-Oriented Software Development

## ARTICLES IN JOURNALS & CONFERENCE PROCEEDINGS

Dambanemuya, H.K., Newlon, B., Ghaffari, R., Rogers, J.A., Wakschlag, L.S., Alshurafa, N. *Understanding the Relationship between Stress and Blood Pressure through Wearable Sensing*. *Annals of Behavioral Medicine*. In review: submitted.

Dambanemuya, H.K., Lin, H., and Horvát, E-Á. *Characterising Online Media on COVID-19 during the Early Months of the Pandemic*. *AAAI: International Conference on Web and Social Media (ICWSM)*. In review: submitted.

Dambanemuya, H.K., and Diakopoulos, N. *Auditing the Information Quality of News-Related Queries on the Alexa Voice Assistant*. *ACM: Computer-Supported Cooperative Work (CSCW)*. In review: major revisions.

Dambanemuya, H.K. and Horvát, E-Á. *A Multi-Platform Study of Crowd Signals Associated with Successful Online Fundraising*. *ACM: Computer-Supported Cooperative Work (CSCW)*. In review: major revisions.

Dambanemuya, H.K. and Horvát, E-Á., 2019. *Harnessing Collective Intelligence in P2P Lending*. In *Proceedings of the 10th ACM Conference on Web Science (WebSci)*. ACM, New York, NY, USA, pp.57-64. DOI: <https://doi.org/10.1145/3292522.3326040>

Dambanemuya, H.K., and Horvát, E-Á., 2019. *Network-Aware Multi-Agent Simulations of Herder-Farmer Conflicts*. *Proceedings of the IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, pp.721-722, IEEE. DOI: <https://doi.org/10.1145/3341161.3343682>

Dambanemuya, H.K., Joshi, M., and Horvát, E-Á., 2019. *Network Perspective on the Efficiency of Peace Accords Implementation*. *Proceedings of the IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM)*, pp.341-348, IEEE. DOI: <https://doi.org/10.1145/3341161.3342895>

Nigam, A., Dambanemuya, H.K., Joshi, M. and Chawla, N.V., 2017. *Harvesting Social Signals to Inform Peace Processes Implementation and Monitoring*. *Big Data*, 5(4), pp.337–355. DOI: <https://doi.org/10.1089/big.2017.0055>

## RESEARCH EXPERIENCE

### Research Assistant

June 2018 – Present

*Horvát's Research Group, Northwestern University: Evanston, IL*

- Developed a general framework for understanding and supporting collective decision-making in online investment, lending, and charity settings to enhance the economic growth of underserved market segments
- Investigated collective intelligence problems in web-based systems to improve the accuracy of collective forecasting from crowd dynamics features. A full paper describing the results of this work was presented at the 10th ACM Conference on Web Science (WebSci '19). Presented on this work at the 2019 International Communication Association Conference (ICA '19) and ACM Collective Intelligence Conference in 2020
- Investigated irrational lending behaviour in online lending settings with herding networks. Presented on this work at the International School and Conference on Network Science (NetSci) in 2020
- Developed network interventions for peace accords implementation. A full paper describing the results of this work was presented at the IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM '19). Presented on this work at the 6th International Conference on Computational Social Science (IC2S2) and International School and Conference on Network Science (NetSci) in 2020

### Research Assistant

March 2020 – Present

*Health Aware Bits (HABits) Lab, Northwestern University: Evanston, IL*

- Developed passive sensing algorithms for monitoring prenatal stress and mental health
- Designed and carried out in-lab and in-the-wild sensor experiments with human participants
- Collected, processed, and analyzed data from unobtrusive electrocardiography (ECG) and photoplethysmography (PPG) sensors

### Research Assistant

June 2019 – June 2020

*Computational Journalism Lab, Northwestern University: Evanston, IL*

- Developed a data-driven methodological approach for evaluating information quality in voice assistants for news-related queries
- Implemented speech synthesis and transcription systems tailored to the specific capabilities and input modalities of the voice assistants and demonstrated on the Amazon Alexa voice assistant
- Deployed MTurk surveys for crowdsourcing user queries and assessing the technical boundaries of the voice assistants' speech synthesis and transcription capabilities
- Presented on this work at the Computation + Journalism Symposium in 2020

### Research Associate

May 2016 – Sep. 2017

*Interdisciplinary Center for Network Science and Applications (iCeNSA): Notre Dame, IN*

- Developed a machine-learning Python API to harvest & analyze social signals to inform peace processes implementation and monitoring. A full paper describing the results of this work was published in *Big Data*, Mary Ann Liebert, Inc.
- Prototyped operational data visualization dashboards using HTML, CSS, and modern front-end JavaScript frameworks
- Implemented a Latent Dirichlet Allocation (LDA) model and a 2-layer Word2Vec neural net to analyze emergent phenomena and identify early warning indicators of peace process success or failure
- Built an ensemble of Support Vector Machine (SVM), Random Forest (RF), Logistic Regression (LR), Bagged Decision Tree (BDT), Adaboost (ADB), and Naïve Bayes (NB) learning algorithms to classify multilingual short-text sentiment with a predictive accuracy of 87.2%

## INDUSTRY EXPERIENCE

### Data Scientist

Sep. 2017 – June 2018

*Chewy, Inc: Dania Beach, FL*

- Provided custom machine learning algorithms and platform development in Python. Signed NDA
- Prepared experimental designs for business units and helped develop data science best practices
- Participated in company-wide efforts to improve data science management and infrastructure

### Software Engineer

May 2014 – June 2015

*Liberty Mutual Insurance Company: Dover, NH*

- Designed, developed, and implemented JAVA Persistence APIs (JPA) through Hibernate Object Relational Mappings (ORM) to enable 12,000+ insurance agents to retrieve policy, billing, and claims information from multiple source systems in real time
- Enhanced Customer Contract Organization (CCO) RESTful web services using spring and J2EE design patterns on WebSphere Application Server (WAS) for support of complex broker scenarios encountered in the largest accounts of a multi-billion dollar business
- Managed continuous integrations and deployments to production using SonarQube and Bamboo and helped ensure that all projects and individual assignments were delivered per scope, schedule, financial, and quality expectations agreed to with the business

### Information Technology Analyst

June 2013 – May 2014

*Liberty Mutual Insurance Company: Seattle, WA*

- Streamlined data management processes through ETL engineering for efficiency-driven enhancements and resource minimization as well as optimizing complex SQL queries and removing bottlenecks resulting in an Informatica grid cost avoidance of \$17 million in 2014
- Enhanced UNIX Shell scripts for ESP workload automation and implemented MLOAD, FASTLOAD, TPUMP and BTEQ utilities of Teradata for performance enhancement thereby reducing skew activity by 40% and shortening 4 daily cycles by 1 to 5.5 hours
- Assisted in identifying opportunities to retire redundant applications and integrate 5 legacy data ecosystems into 1 target ecosystem, reducing the total number of commercial insurance applications from -900 to -400 resulting in \$465 million estimated cost savings

### Information Technology Intern

June 2012 – Aug. 2012

*Liberty Mutual Insurance Company: Indianapolis, IN*

- Developed, implemented, and documented an internal interactive timeline web-application using HTML, JavaScript, and Scalable Vector Graphics (SVG)
- Partnered with portfolio management resources to research the possibility of developing a SharePoint proof-of-concept to sit on top of the Infrastructure and Operations Metrics Database and leverage the analytical components of Microsoft PerformancePoint which supports two dimensional data sources, PowerPivot and SQL Analysis Services

### Software Quality Assurance Intern

May 2011 – Nov. 2011

*RICS Software: Indianapolis, IN*

- Verified the system architecture and improved the overall quality for an on-demand Retail Inventory Control System (RICS) that includes Point-of-Sale (POS), Customer Relationship Management (CRM), and Inventory Control Functionality (ICF) through automated Web Application Testing in .NET (WatiN), and Microsoft Coded UI Tests
- Researched, evaluated, and recommended alternative software testing tools such as Microsoft Test Manager 2010 (MTM), and System Center Virtual Machine Manager (SCVMM)

## TEACHING EXPERIENCE

**Teaching Assistant - Cultural and Art Analytics (MS in Leadership and Creative Enterprise 515)** Fall 2020  
*School of Communication (SOC): Northwestern University, IL*

**Teaching Assistant - Global Human Trafficking (Special Topics in Social Policy 351)** Fall 2019  
*School of Education and Social Policy (SESP): Northwestern University, IL*

## VOLUNTEER EXPERIENCE

**Special Adviser** June 2011 – Aug. 2014  
*The Sentinel Project for Genocide Prevention: Toronto, Canada*

- Advised and guided the development of the organization's first early warning system for genocide prevention, bolstering their ability to identify and monitor 4 high-risk communities across the world
- Assisted in the development, testing, and initial deployment phase of the Hatebase API's HateBot engine that interacts with external APIs to retrieve potential sightings of multilingual hate speech, and HateBrain, a linguistic parser that automates hate speech classification

**Data Systems Analyst** Sep. 2013 – May 2014  
*Space United Denver, CO*

- Conducted operational research on Space United's Space Humanitarian Imagery Mission (SHIM-1) pilot project to evaluate the feasibility of using high resolution multispectral and panchromatic satellite imagery to improve on-the-ground relief efforts for humanitarian initiatives

**High School Tutor** Sep. 2013 – Dec. 2013  
*Horn of Africa Services, Seattle, WA*

- Provided homework help and math-focused tutoring to East African refugee and immigrant youth from grades 9-12 in order to improve their school performance and to prepare them for the High School Proficiency Exam (HSPE)
- Participated in volunteer training activities to strengthen the After School Program at two Seattle Housing Authority low-income housing sites

**Campaign Organizer** Jan. 2011 – Mar. 2013  
*Center for American Progress, Washington DC*

- Co-led the national Conflict-Free Campus Initiative to advocate to the electronics industry to ethically manufacture their devices by tracing, auditing, and certifying the source of their raw materials directly to the mine of origin. Following the campaign in 2016, all Intel products are now "conflict-free".

**Co-Founder** Aug. 2010 – May 2011  
*DePauw E-Waste Recycling Program, Greencastle, IN*

- Conducted an environmental study to assess the impact of electronic waste (e-waste) pollution in the city of Greencastle, Indiana
- Presented study results to the City of Greencastle, Indiana, resulting in the establishment of a long-term R2 certified e-waste recycling program for Putnam county residents

## ACADEMIC SERVICE

- 2020: Reviewer, Harvard Kennedy School Misinformation Review
- 2020: Reviewer, AAAI International Conference on Web and Social Media (ICWSM)
- 2020: Reviewer, ACM Conference on Computer Supported Cooperative Work (CSCW)
- 2018 - Present: Director, Board of Directors, DePauw University Alumni Association, Greencastle, IN
- 2018 - 2019: Reviewer, International Communication Association (ICA)
- 2018: Volunteer, International Conference on Computational Social Science (IC<sup>2</sup>S<sup>2</sup>)

- 2016 – 2017: Member, Distinguished Alumni Selection Committee, Kroc Institute for International Peace Studies, University of Notre Dame, Notre Dame, IN
- 2012 – 2013: Ambassador, Office of the President, DePauw University, Greencastle, IN
- 2012 – 2013: Advisor, Student Government Advising Committee, DePauw University, Greencastle, IN
- 2012 – 2013: Member, University Review Committee, DePauw University, Greencastle, IN
- 2012 – 2013: Member, International Education Committee, DePauw University, Greencastle, IN
- 2011 – 2012: Member, Asher Fund Steering Committee, DePauw University, Greencastle, IN
- 2011 – 2012: Member, International Student Advisory Board, DePauw University, Greencastle, IN
- 2011 – 2012: Member, Community Standards Hearing Board, DePauw University, Greencastle, IN
- 2010 – 2011: Member, Student Government Allocations Board, DePauw University, Greencastle, IN

## HONORS & AWARDS

- Graduate Student Assistantship ≈\$88,764/yr, Northwestern University (2018 – Present)
- Conference Travel Grants \$3,600, Northwestern University (2018 – 2019)
- Graduate Student Fellowship, Full Scholarship ≈\$125,800, University of Notre Dame (2015 – 2017)
- Data Science Summer Tuition Scholarship \$2,000, University of Notre Dame (Summer 2016)
- Liberty Mutual Bravo Award, Liberty Mutual Insurance Company (2015)
- Dr. Irving Sirlin Distinguished Honors Scholar Award, DePauw University (2013)
- Harold M. Schulweis Fellowship \$3,000, Jewish World Watch (2012)
- DePauw University Dean's List (2012 – 2013)
- Liberty Mutual Responsible Scholars Award, Scholarship \$1,000, Liberty Mutual Insurance Company (2012)
- President's Award for Excellence, Full Scholarship ≈\$200,000, DePauw University (2009 – 2013)