

# KATO MIVULE, D.Sc.

| Tel: 443 333 6169 | Email: kmivule@gmail.com | katomivule.org |

## EDUCATION

---

- **D.Sc. Computer Science** – Bowie State University, Bowie, Maryland, USA, May 2014
- **B.A. Computer Science** – University of Missouri - Kansas City, MO, USA, May 2004
- **A.S. Info Systems** – Longview Community College Lee's Summit, MO, USA, May 2001

## RESEARCH INTERESTS

---

- Data Privacy and Security, Cybersecurity Data Analytics, Machine Learning, Private Information Retrieval, Database Systems, Software Engineering, and Artificial Intelligence.

## RESEARCH EXPERIENCE

---

### **Norfolk State University, Norfolk Virginia**

*Assistant Professor of Computer Science, August 2016 – Present*

- Current research includes data privacy, cybersecurity data sharing, and machine learning and privacy preservation in information retrieval systems.

### **Air Force Institute of Technology, Dayton Ohio**

*National Research Council (NRC) Post Doctoral Research Associate, October 2014 – August 2016*

- Worked on research project titled, “Privacy-Preserving Web Search Log Publication for Collaborative Cybersecurity Sharing”, that involves developing new data swapping algorithms for web search query log publication using distortion-based techniques, and using machine learning to gauge for data usability.
- Developed a new web search privacy heuristic, “Distortion Search and Formulated new web search query obfuscation heuristic for user intent privacy and tracked AdSense ads to study effect of both query and user intent obfuscation on retrieved search results.
- Used machine learning for text mining retrieved Google snippet search results. Applied information retrieval metrics such as, precision, recall, and F-measure to quantify the obfuscation effectiveness.
- Used Amazon AWS for cloud-based machine learning that involved predicting informational web search queries from transactional web search queries for privacy preserving information retrieval.

### **Los Alamos National Laboratory, Los Alamos, NM**

*Summer Post Graduate Research Associate, June – September 2014.*

- Research project was titled, “A Study of Utility-aware Network Trace Data Anonymization”. Proposed heuristics for publishing privatized network trace data for cybersecurity collaboration and data sharing.
- Used Machine Learning with RapidMiner to predict the usability of the privatized Network Trace data by employing classification as a gauge.

### **Bowie State University, Bowie MD**

*Data Privacy Research Assistant: Sept 2009 – June 2014*

- Proposed and published a codon frequency obfuscation heuristic for raw genomic data privacy; published results as a book chapter – Emerging Trends in Bioinformatics [tiny.cc/q35j0x].
- Proposed, applied, and published the specifications, implementation, evaluation, and dissemination (SIED) data privacy engineering and modeling framework [tiny.cc/4h6j0x].

- Proposed, applied, and published the  $x$ -CEG (classification error gauge) machine learning heuristic for gauging data privacy and usability of privatized data [tiny.cc/886j0x].
- Designed and published a hybrid of the  $x$ -CEG heuristic and signal processing techniques to generate privatized synthetic datasets [tiny.cc/6m7j0x].
- Proposed and published data privacy and utility heuristic using Differential Privacy and the Moving Average Filter to generate usable privatized synthetic datasets [tiny.cc/h67j0x].
- Proposed, applied, and published a heuristic to generate privatized numeric synthetic data using distance transforms and k-means clustering to gauge data usability [tiny.cc/2o8j0x].
- Implemented data privacy using noise addition, data swapping, multiplicative, logarithmic noise, differential privacy, suppression, generalization, and k-anonymity [tiny.cc/yzak0x].
- Proposed data privacy indices, Initial Basic Privacy (IBP), and Subsequent Basic Privacy (SBP), to quantify for privacy and utility needs [tiny.cc/yzak0x].
- Presented research results in academic and scientific conferences in the USA, Europe, and Asia.

#### TEACHING EXPERIENCE

---

##### **Norfolk State University, Norfolk Virginia**

*Assistant Professor – August 2016 – Present – Classes Taught and Currently Teaching*

- CSC 260 Computer Programming II using C++ – Fall 2016
- CSC 260 Computer Programming II using C++ Lab – Fall 2016
- CSC 260 Computer Programming II using C++ – Spring 2017
- CSC 455 Management of Information Security, Online – Spring 2017
- CSC 468 Computer Architecture – Spring 2017

##### **ROSA International IT Consultants, Kampala, Uganda**

*IT Specialist: March 2006 – August 2007*

- Using Microsoft Office (MS) 2003 – MS Word, MS Word, and MS Excel
- Introduction to Database Design using MS Access and MySQL
- Introduction to Programming using C++

#### CERTIFICATIONS AND PROFESSIONAL DEVELOPMENT

---

- Certified Instructor for Teaching Distance Education Courses – Norfolk State University, 2017.
- Certificate of Completion – SANS Cyber Defense Initiative – Security Essentials Boot camp Style, Washington DC, December 2016.

#### HONORS AND AWARDS

---

- Certified Instructor for Teaching Distance Education Courses – Norfolk State University, 2017.
- National Research Council (NRC) Post Doctoral Research Associate Award – 2014 - 2016
- 2014 Best dissertation of the year award – Bowie State University.
- 2014 Best computer science oral presentation award – Emerging Researchers National Conference in STEM (ERN 2014).

#### PUBLICATIONS

---

1. Kato Mivule, "Web Search Query Privacy, An End-user Perspective", Journal of Information Security, January 2017, DOI: dx.doi.org/10.4236/jis.2017.81005
2. Kato Mivule, "Permutation of Web Search Query Types for User Intent Privacy" International Journal of Advanced Computer Science and Applications (IJACSA), 8(1), 2017. <http://dx.doi.org/10.14569/IJACSA.2017.080102>

3. Loubna Dali, Kato Mivule, and Hoda El-Sayed, "A Heuristic Attack Detection approach using the "Least Weighted" Attributes for Cyber security Data", Intelligent Systems Conference (IEEE), London, UK, 2017, Accepted.
4. Kato Mivule and Blake Anderson, "A study of usability-aware network trace anonymization," in Science and Information Conference (SAI), 2015, IEEE, pp.1293-1304, 28-30 July 2015, doi: [dx.doi.org/10.1109/SAI.2015.7237310](https://doi.org/10.1109/SAI.2015.7237310)
5. Kato Mivule, "A Study of Privatized Synthetic Data Generation Using Discrete Cosine Transforms" International Journal of Advanced Computer Science and Applications (IJACSA) 5(11), 2014. <http://dx.doi.org/10.14569/IJACSA.2014.051107>
6. Kato Mivule and Claude Turner, "Applying Moving Average Filtering for Non-interactive Differential Privacy Settings", Procedia Computer Science, Volume 36, ISSN: 1877-0509, 2014, Pages 409-415. DOI: [dx.doi.org/10.1016/j.procs.2014.09.013](https://doi.org/10.1016/j.procs.2014.09.013)
7. Kato Mivule, "Towards Agent-based Data Privacy Engineering", Proceedings of the Sixth International Conference on Advanced Cognitive Technologies and Applications – COGNITIVE 2014, Pages 5-12, 2014, Venice, Italy
8. Kato Mivule and Claude Turner, "A Review of Privacy Essentials for Confidential Mobile Data Transactions", International Journal of Computer Science and Mobile Computing, ICMIC13, December- 2013, pg. 36-43, Trivandrum, Kerala, India
9. Kato Mivule, Claude Turner, "A Comparative Analysis of Data Privacy and Utility Parameter Adjustment, Using Machine Learning Classification as a Gauge", Procedia Computer Science, Volume 20, 2013, Pages 414-419, Baltimore MD, USA
10. Kato Mivule and Claude Turner, "An Investigation of Data Privacy and Utility Preservation Using KNN Classification as a Gauge", International Conference on Information and Knowledge Engineering (IKE 2013), July 22-25, Pages 203-204, Las Vegas, NV, USA
11. Kato Mivule, Darsana Josyula, and Claude Turner, "Data Privacy Preservation in Multi-Agent Learning Systems", The Fifth International Conference on Advanced Cognitive Technologies and Applications – COGNITIVE 2013, May 27 - June 1, 2013, Valencia, Spain.
12. Kato Mivule, Claude Turner, and Soo-Yeon Ji, "Towards A Differential Privacy and Utility Preserving Machine Learning Classifier", Procedia Computer Science (Complex Adaptive Systems), 2012, Pages 176-181, Washington DC, USA
13. Kato Mivule, Stephen Otunba, Tattwamasi Tripathy, Sharad and Sharma, "Implementation of Data Privacy and Security in an Online Student Health Records System", Proceedings at the ISCA 21th Int Conf on Software Engineering and Data Engineering (SEDE-2012), Pages 143-148, Los Angeles, CA, USA
14. Kato Mivule, "Utilizing Noise Addition for Data Privacy, an Overview", Proceedings of the International Conference on Information and Knowledge Engineering (IKE 2012), Pages 65-71, Las Vegas, NV, USA.
15. Kato Mivule, Claude Turner, "Applying Data Privacy Techniques on Published Data in Uganda", Proceedings of the 2012 International Conference on e-Learning, e-Business, Enterprise Information Systems, and e-Government (EEE 2012), Pages 110-115, Las Vegas, NV, USA.

16. Kato Mivule and Claude Turner, "SIED, A Data Privacy Engineering Framework", Abstracts, Emerging Researchers National Conference in STEM (ERN 2014), Page A239, ISBN 978-0-87168-757-9, Feb 20-22, 2014, Washington DC, USA.
17. Kato Mivule and Claude Turner, "An Investigation of Data Privacy and Utility Using Machine Learning as a Gauge", Abstracts, Doctoral Consortium Presentation, Richard Tapia Celebration of Diversity in Computing Conference, TAPIA 2014, Seattle, Washington, USA, February 5-8, 2014.

#### BOOK CHAPTERS

---

1. Kato Mivule, "Modeling Data Privacy in Africa," in Information Communication Technology (ICT) Integration to Educational Curricula: A New Direction for Africa, 1st ed., C. U. Nwokefor, Ed. University Press of America, 2015, pp. 154–171 [[tiny.cc/rtk0x](http://tiny.cc/rtk0x)].
2. Kato Mivule, "A Codon Frequency Obfuscation Heuristic for Raw Genomic Data Privacy", Book Chapter, Emerging Trends in Computational Biology, Bioinformatics, and Systems Biology: Algorithms and Software Tools, Arabnia and Nam Tran (Eds), Morgan Kaufmann, 2015, Pages 603-619, ISBN 9780128026465 [<http://tiny.cc/89eu3x>].

#### PRESENTATIONS

---

1. Kato Mivule, "An investigation of Data Privacy and Utility Using Machine Learning as a Gauge", Successful Dissertation Defense, at Bowie State University, Graduate School, April 17, 2014.
2. Kato Mivule and Claude Turner, "SIED, A Data Privacy Engineering Framework", Abstracts, Emerging Researchers National Conference in STEM (ERN 2014), Page A239, ISBN 978-0-87168-757-9, Feb 20-22, 2014, Washington DC, USA. [Best Oral Presentation Award]
3. Kato Mivule and Claude Turner, "An Investigation of Data Privacy and Utility Using Machine Learning as a Gauge", Doctoral Consortium Presentation, Richard Tapia Celebration of Diversity in Computing Conference, TAPIA 2014, Seattle, Washington, USA, February 5-8, 2014.
4. Kato Mivule and Claude Turner, "A Review of Privacy Essentials for Confidential Mobile Data Transactions", In the Proceedings of the International Conference on Mobility in Computing, ICMiC13, Dec 17-18, 2013, Trivandrum, Kerala, India.
5. Kato Mivule, "An Investigation of Data privacy and Utility Preservation Using Multiple Machine Learning Classifiers as a Gauge", Poster Presentation, 2013 National Laboratories Professional Development Workshop for Underrepresented Participants, Oak Ridge National Laboratory, June 13-14, 2013, Oak Ridge, TN, USA.
6. Kato Mivule, "An Investigation of Data privacy and Utility Preservation Using Multiple Machine Learning Classifiers as a Gauge", Doctoral Proposal Defense, Computer Science Dept., Bowie State University, April, 16th 2013, Bowie, MD, USA.
7. Kato Mivule and Claude Turner, "An Investigation of Data Privacy and Utility using Machine Learning Classifiers as a Gauge", Poster Presentation, 2013 6th Annual Bowie State University Grants Expo and Research Day, Bowie State University, Bowie, Maryland, USA, April 10, 2013.

8. Kato Mivule, "An Investigation of Data privacy and Utility Preservation Using Multiple Machine Learning Classifiers as a Gauge", Spring 2013 Seminar Series - Bowie State University Computer Science Department, April 9th 2013, Bowie, MD, 2013.
9. Kato Mivule and Claude Turner, "Investigating Differential Privacy and Utility in Machine Learning Classifiers", Poster and Doctoral Consortium Presentation, Richard Tapia Celebration of Diversity in Computing Conference, TAPIA 2013, Washington DC, USA, February 7 - 10, 2013
10. Kato Mivule, Claude Turner, and Soo-Yeon Ji, "Towards A Differential Privacy Preserving Utility Machine Learning Classifier", Poster Presentation, 2012 5th Annual Bowie State University Grants Expo and Research Day, Bowie State University, Bowie, Maryland, USA, April 12, 2012.
11. Kato Mivule and Claude Turner, "A Framework for Data Privacy and Security in sub-Saharan Africa", Doctoral Consortium Presentation, Richard Tapia Celebration of Diversity in Computing Conference, TAPIA 2011, San Francisco, California, USA, April 3-5, 2011.

## PROFESSIONAL EXPERIENCE

---

### **Cornerstone Staffing, Fort Worth, TX**

*Quality Assurance Specialist: Jun 2009 – Aug 2009*

- Did operational diagnosis, hardware and software test calibration on refurbished cell phones, isolating failed cell phones, reinstalling cell phone operating system software, and documentation.

### **Dell, Winston Salem, NC**

*Technical Support Specialist: June 2008 – Jan 2009*

- Troubleshooting of desktop systems that failed during manufacturing process. Perform operational diagnosis, repair, test calibration on assembled desktops, and documentation.

### **ROSA International IT Consultants, Kampala, Uganda**

*IT Specialist: March 2006 – August 2007*

- Carried out I.T training needs analysis for experienced and novices users; Designed course material, handouts, manuals and exercises. Prepared the learning environment including setting up IT equipment; Delivered training programs to clients either in a group classroom setting, self-learning packages, or on a one-to-one basis. Evaluated the training and course outcomes and kept up to date with relevant online training technology.

### **Web Developer, (Freelancer)**

*Freelance web designer: May 2002-2011*

- Gathered website design requirements from clients; procured domain names and web hosting for clients; created website prototypes for clients.
- Turned accepted prototypes into full operating websites. Used Joomla, WampServer (PHP and MySQL), WordPress to generate websites and prototypes.

### **Metro Christian Fellowship, Kansas City, MO**

*Computer Support Technician: Jan 2001 – Jan 2002*

- Troubleshooting hardware and software malfunctions on Windows based platforms. Made Antivirus updates; installed, configured, maintained, made upgrades on operating systems and hardware, including documentation of both problems and solutions.

## UNIVERSITY SERVICE

---

### **Norfolk State University** – *August 2016 – Present*

- Participated as a member of the PhD in Computer Science Doctoral Program Proposal Committee that involved generating ideas and contributing towards the proposed PhD in Computer Science Program.
- Advising – currently serving as an advisor for senior students at the undergraduate level for their capstone project.

### **Other Academia Related Service**

- Advising – Currently acting as an external advisor to a Doctoral Student at Bowie State University; project includes using machine learning for cybersecurity data analytics and improving IDS systems – 2016 – Present; Research paper accepted for publication – The IEEE SAI conference, 2017.
- Volunteer Session Chair at the International Conference on Information and Knowledge Engineering (IKE 2013), July 22-25, Las Vegas, NV, USA.
- Volunteer Session Chair at the Fifth International Conference on Advanced Cognitive Technologies and Applications – COGNITIVE 2013, May 27 - June 1, 2013, Valencia, Spain.
- Volunteer Session Chair at the International Conference on Information and Knowledge Engineering (IKE 2012), July 2012, Las Vegas, NV, USA.
- Program Liaison, Graduate Students Association, Bowie State University; 2013 – 2014.

## ASSOCIATIONS

---

- Institute of Electrical and Electronics Engineers (IEEE), member.
- Association for Computing Machinery (ACM), member.
- National Society of Black Engineers (NSBE), member.

## LANGUAGES

---

- English, Luganda, and Swahili.

## INTERESTS

---

- An avid long distance runner. Enjoy travel, studying history, philosophy, and comparative religion studies. Spending time with my family.
- Volunteer adviser to a doctoral student on using RapidMiner and Amazon Machine Learning for cyber-attack analytics and predictions on network traces [[tiny.cc/fknl0x](http://tiny.cc/fknl0x)].