NOËLLE RAKOTONDRAVONY

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I'm a PhD student in Comp. Sci. focusing on Data Visualization and Human-Computer Interaction. I am looking for a summer internship (2023) in UX/UI rsearch, or in fields where I can apply CS and HCI principles to the design, evaluation, and implementation of interactive interfaces and experiences that are data-driven, human-centered and/or culturally relevant.

EXPERTISE

Visualization and Interface design: JavaScript (ReactJS, D3js, AngularJS), Java, Adobe Illustrator
Experiment design: statistical inference, A/B testing, crowdourced studies
Mixed method research: qualitative/quantitative analyses, R, Firebase, MongoDB, NVIVO
Software Design and Analysis

EDUCATION

Ph.D in Computer Science Aug. 2019 - present
Worcester Polytechnic Institute, MA. GPA: 4.0/4.0
Research focus: *Cross-cultural study of HCI and data visualization*
Advisor: Prof. Lane Harrison

Masters in Computer Science
Worcester Polytechnic Institute, MA. GPA: 4.0/4.0
Research focus: *Cross-language study of data visualization* [1]
Selected courses: Data visualization, Design & Analysis of large crouwdsourcing experiments, Algorithm design & analysis, Software design & analysis

National Diploma of Telecommunications Engineering 2010 - 2015
Higher School of Communications of Tunis, Tunisia
Major: *Telecommunications and cybersecurity*
Thesis: Design and Evaluation of Redactable Signature algorithms on IoT devices [4]

RESEARCH PROJECTS

- Research methods: (multilingual) experimental study, inference analysis, software and interface design, eye-tracking, (semi-structured) interview studies, grounded theory
- Design tools and languages: ReactJS, D3.js, Firebase, Mongo DB
- Analysis tool: R, inc. ggplot2, dplyr, NVIVO

Cross-cultural data visualizations

I run controlled experiment explore the interplay of people's cultural background and the way they design or interact with data visualizations and computer systems. Example topics: the perception of risk through charts across languages [1], the impact of dual languages on the interpretation of data visualization [2]

HCI and visualization literacy

I research how to help people reason with data and interactive technologies through new experimental methods that improve their data visualization and HCI literacy [3]

Writing directions in data visualization

I collect and analyze eye-tracking data to investigate how people navigate interactive interfaces in languages with different writing directions, and how that impacts their learning with and exploration of their data.

Human factors in cybersecurity

I investigate the organizational and technical challenges and barriers that security analysts face when adopting state-of-the-art visual analytics tools and best-practices [9]

LANGUAGES

I am fluent in **Malagasy, French, English, German, Portuguese (BR)**, and **Arabic (TN)**

PROFESSIONAL EXPERIENCES

TEACHING ASSISTANTSHIP

Worcester Polytechnic Institute
Fall 2019 - Fall 2022

I assisted the following classes:

Web development, Software engineering, Human-Computer Interaction, Data Visualization, Operating Systems, Algorithms, Object-Oriented Programming, Foundations of CS, Computer Network

Award: TA of the year 2020 (CS dept.), 2021 (Honorable Mention College-wide)

RESEARCH ASSOCIATE

University of Passau, Germany
2015 - 2019

I conducted the following projects:

FORSEC project (2015-2017): I built and maintained a resource aware architecture for visualizing low-level security data in IaaS cloud [5] collected using Virtual Machine Introspection techniques [6]

DINGFEST project (2018-2019): I studied the design and evaluation of visual analytics components in next-generation SIEM systems [7]

ARADIA project (2018-2019): I designed visualization tools with linked multiple views of multi-sources data to support cyber security monitoring tasks [8]

OpenC3S (2017-2019): I co-designed syllabi and teaching materials for Cloud Computing Security classes as part of the "largest basic and advanced education initiative in German-speaking countries in the area of cyber security"

Working tools and languages: C++, JavaScript, React.js, D3.js, Tableau, IaaS cloud tech (OpenNebula, AWS), Java

SERVICES and OUTREACH

- Madagascar R users group: Co-Founder, outreach and international cooperation chair
- ASSETS 2022: student volunteer
- IEEE VIS: student volunteer for 2020 and 2021
- IEEE Symposium on Visualization for Cyber Security: Program committee (2018-2020), Publicity co-chair (2021), Publicity chair (2022)
- Data Visualization Society (DVS): editor for Nightingale, the journal of the DVS, organizing committee member for Outlier Conference
- Ikala STEM (Madagascar-based non-profit association for empowering female Malagasy Scientists): managing editor for DIARY-Ikala STEM's yearly journal, mentor at Ikala STEM mentoring program, US resident member (prev. EU resident member)
- First series of IT-security summer school in Madagascar: Project leader of the 2018, 2019, and virtual 2020 editions.

AWARDS

- WPI Diversity, Equity, Inclusion and Justice planning grant ($ 4000)
- WPI teaching assistant of the year: 2020, 2021 (honorable mention college-wide)
- Women in Cyber Security WiCyS scholar (Aurora CO, 2020)
- Grace Hopper Celebration scholarship (Houston TX, Sep. 2018)
- Young Security Changers Scholarship at the Munich Security Conference (Germany, 2018)
- Diversity scholarship VizSec (Oct. 2017) at the Symposium on Visualization for Cyber Security (Phoenix AZ, Sept. 2017)
- DAAD exchange student scholarship, (Passau Germany, May-Sep 2015)

SELECTED PUBLICATIONS & POSTERS

Complete list of publication available on DBLP and Scholar

[1] N. Rakotondravony, Y. Ding, L. Harrison: "Probablement, Wahrscheinlich, Likely? A Cross-Language Study of How People Verbalize Probabilities in Icon Array Visualizations". IEEE Transactions on Visualization and Computer Graphics (TVCG) 2022

[2] H. Andrianarivony, T. Raharison, I. Rakotoniaina, M. Ramarokoto, N. Rakotondravony, L. Harrison: "Investigating the Use of Native and Secondary Language with Data Visualization in Madagascar". IEEE VIS 2022 - poster track

[3] R. Birchfield, M. Caten, E. Cheng, M. Kelly, T. Larson, H. P. Pham, Y. Ding, N. Rakotondravony, L. Harrison: "VisQuiz: Exploring Feedback Mechanisms to Improve Graphical Perception". [To appear] IEEE Transactions on Visualization and Computer Graphics (TVCG) 2022

[4] C. Frädrich, H. C. Pöhls, W. Popp, N. Rakotondravony, Kai Samelin.: "Integrity and authenticity protection with selective disclosure control in the cloud & IoT". In International Conference on Information and Communications Security. Springer, Cham, 2016.

[4] N. Rakotondravony, Lane Harrison. "Visualization for Cyber Security and Security Analysts' Use of Visualizations: Is There a Gap?" Poster at IEEE Symposium on Visualization for Cyber Security, 2020.

[5] N. Rakotondravony and H. P. Reiser, "Visualizing and Controlling VMI-based malware analysis in IaaS Cloud." In Symposium on Reliable Distributed Systems (SRDS), 2016.

[6] B. Taubmann, N. Rakotondravony and H. P. Reiser, "CloudPhylactor: Harnessing Mandatory Access Control for Virtual Machine Introspection in Cloud Data Centers". In the 15th IEEE International Conf. on Trust, Security and Privacy in Computing and Communications, 2016.

[7] F. Böhm, N. Rakotondravony, G. Pernul, H. P. Reiser, "Exploring the roles of experts' knowledge in cyber security visualizations." Poster at the IEEE Symposium on Visualization for Cyber Security, 2018.

[8] N. Rakotondravony and H. P. Reiser, "Visualizing BFT SMR distributed systems - example of BFT-SMaRt". In DSN Workshop on Byzantine Consensus and Resilient Blockchains, 2018.

[9] M.A. Puentes, Y. Lei, N. Rakotondravony, L.T. Harrison, C.A. Shue, "Visualizing Web Application Execution Logs to Improve Software Security Defect Localization". 5th Workshop on Validation, Analysis and Evolution of Software Tests, 2022.