

EDUCATION

Ph.D in Computer Science - Worcester Polytechnic Institute. GPA: 4.0/4.0
Research focus: *Data Visualization across Cultures and Languages*
Advisor: Prof. Lane Harrison
Expected graduation: Dec. 2025

Masters in Computer Science - Worcester Polytechnic Institute. GPA: 4.0/4.0
Selected courses: Data visualization, Design & Analysis of large online experiments, Algorithm design & analysis, Software Engineering

National Engineering 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 [6]

EXPERTISE

Design of online and multilingual experiments: user study design, mixed method
Interactive Data Visualization, UI design: JavaScript, ReactJS, D3js, Java, Figma, Adobe Illustrator
Data Analysis: R, Python

PROFESSIONAL EXPERIENCES

STUDENT RESEARCHER Google US-SFO (Nov. 2024 - today)
Through a systematic literature review, and user studies, I investigate how to ensure Google's UI elements can support users from across different cultures.

VISITING RESEARCHER Univ. of Konstanz, Germany (Summer 2024)
Data Visualization and Analysis Group, directed by Prof. Daniel Keim
I designed an experiment to investigate code-switching in natural language interfaces for data visualizations.

RESEARCH ASSISTANTSHIP (RA) WPI (Fall 2023-Spring 2024)
I run independent research studies on cross-cultural data visualization at VIEW, the data visualization lab at WPI, through online, multilingual user experiments design and analyses.

Tools & languages: JavaScript, ReactJS, Firebase, Figma, Qualtrics, Prolific

VISITING RESEARCHER Univ. of Konstanz, Germany, (Spring-Summer 2023)
Data Visualization and Analysis Group, directed by Prof. Daniel Keim

TEACHING ASSISTANTSHIP (TA) WPI (Fall 2019 - Fall 2022)
2019-2020: Web Development, Software Engineering, HCI, Data Visualization,
2020-2021: Operating Systems, Algorithms, Advanced Object-Oriented Programming, Data Visualization, Computer Networks
2021-2022: Foundations of Comp. Sci., Algorithms, HCI, Data Visualization, Web Dev., Soft. Eng.

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

RESEARCH ASSOCIATE Univ. of Passau, Germany (2015-2019)
I contributed the following projects:

FORSEC project (2015-2017): developed a data visualization architecture for low-level security data in IaaS cloud [7] collected using Virtual Machine Introspection techniques [8]

DINGFEST project (2018-2019): I designed visual analytics components for next-generation SIEMs [9]

ARADIA project (2018-2019): I designed a multi-view component-based dashboard with to support cyber security monitoring tasks [10] within an enterprise network

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

Tools & languages: C++, JavaScript, React.js, D3.js, Tableau, IaaS cloud (OpenNebula, AWS), Java

Ph.D. RESEARCH PROJECTS

I conduct (large) user studies to understand how the design and use of data visualizations vary across cultures and languages. I focus on three aspects of a data visualization ecosystem: **natural languages, visualization literacy, and color perception.**

Natural language and data visualizations

I investigate the combination of natural language and chart, and the challenges or opportunities that it raises across different cultures and languages. Example projects:

- an online experiment in five languages to study the perception of uncertainty through charts across English, French, Mandarin, Arabic, and German [1]
- a study of the impact of dual languages on the interpretation of data visualization [2]. I argue that multilingualism in research can increase who can access and benefit from data visualizations [3]

Cross-cultural study of visualization literacy

I study the variation of chart reading skills (a.k.a vis literacy) across languages and different cultural identities.

- I study how to effectively design visualization literacy assessment tests that scale and are adapted to test takers from different cultural backgrounds [4]
- I research how visualizations are made in RTL languages [5]. I interview designers of visualizations in Arabic to understand their process, challenges, and expectations when designing for RTL speaking audiences. This study is complemented with an online experiment testing Arabic speakers’ intuitive reading direction of charts and visualizations [work in progress]

Perception of color across cultures

I model how we can predict how people’s interpretation of colors in chart varies across culture, knowing their color-concept association [under review]

LANGUAGES

I speak **Malagasy, French, English, German, Portuguese (BR), and Arabic (TN)**

SERVICES and OUTREACH

- AfriCHI 2025: Organizing Committee, Communication chair
- IEEE VIS: student volunteers chair 2023-2024, student volunteer 2020 - 2022
- CHI conference: student volunteer 2023-2024
- IEEE VizSec: Organizing Committee 2019-2022, Publicity chair
- We R, Madagascar R Users Group: Co-Founder, outreach and international cooperation chair
- ASSETS conference: student volunteer 2022
- Data Visualization Society (DVS): editor for Nightingale, organizing committee for Outlier Conference
- Ikala STEM Madagascar managing editor for Ikala STEM’s journal, mentor
- First series of IT-security summer school in Madagascar: Project leader of the 2018-2020 editions
- AnitaB.org mentorship program: Mentor

AWARDS

- WPI Diversity, Equity, Inclusion and Justice planning grant 2022 (\$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)
- DAAD exchange student scholarship, (Passau Germany, May-Sep 2015)

SELECTED PUBLICATIONS

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] [N. Rakotondravony](#), Dhawka, and Bancilhon. “Beyond English: Centering Multilingualism in Data Visualization.” *Visualization for Social Good, IEEE VIS 2023*.
- [4] [N. Rakotondravony](#), H. Andrianarivon, T. Raharison, L. Harrison: “Exploring Multilingual and Culturally-Adapted Visualization Literacy Assessments”. *Workshop Toward a More Comprehensive Understanding of Visualization Literacy at CHI 2024*.
- [5] M. Alebri, [N. Rakotondravony](#), L. Harrison: “Design Patterns in Right-to-Left Visualizations: The Case of Arabic Content” In *IEEE Transactions on Visualization and Computer Graphics 2024*
- [6] C. Frädrieh, H. C. Pöhls, W. Popp, [N. Rakotondravony](#), K. Samelin, “Integrity and authenticity protection with selective disclosure control in the cloud & IoT”. In *International Conference on Information and Communications Security*. Springer, Cham, 2016.
- [7] [N. Rakotondravony](#) and H. P. Reiser, “Visualizing and Controlling VMI-based malware analysis in IaaS Cloud.” In *Symposium on Reliable Distributed Systems (SRDS)*, 2016.
- [8] 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.
- [9] F. Menges, F. Böhm, M. Vielberth, A. Puchta, B. Taubmann, [N. Rakotondravony](#), T. Latzo, “Introducing DINGfest: An architecture for next generation SIEM systems”. *Gesellschaft für Informatik, SICHERHEIT 2018*, Bonn 2018.
- [10] [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.