Dr. Nono S. C. Merleau

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EDUCATION

Ph.D. in Computer Science (*Magna cum laude*) *2018 - 2023*
Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany

M.Sc. in Mathematical Sciences *2017 - 2018*
The University of Ghana, Legon (AIMS Ghana)

M.Sc. in Computer Science (Systems/Distributed Env.) *2012 - 2014*
The University of Ngaoundéré, Bini, Cameroon

B.Sc. in Mathematics and Computer Science; speciality: Architecture and Network *2009 - 2012*
The University of Ngaoundéré, Bini, Cameroon

Bacalauréat C (Math/Physics) *2008 - 2009*
Lycée Classique et Moderne de Maroua, Cameroun

ACADEMIC AND INDUSTRIAL POSITIONS

RESEARCH AND TEACHING

Postdoctoral Researcher, University of Leipzig/ScaDS.AI, Germany *07.2026 - Present*

Key contributions:

- Conduct independent research in ML applied to RNA Bioinformatics
- Implementing the prototype of `RRnaDesign` (Obtained an ECIP-CFP grant of $\approx$ EURO 20,000)

Adjunct Lecturer, SHR University Leipzig, Germany *04.2026- Present*

Key contributions:

- Design and teach the course Programming I for BSc. first-year students
- Prepare lecture notes and assessment documents

Adjunct Lecturer, Lancaster University Leipzig, Germany *10.2023 - Present*

Key contributions:

- Teach Pre-Master Students in Mathematics, Statistics and Software Engineering
- Prepare lecture notes and assessment documents
- Maintain and keep the Moodle platform up to date
- Mark the submitted assessments and publish the grades.

Postdoctoral Researcher, University of Leipzig/ScaDS.AI, Germany *01.2023 - 31.2025*

Key contributions:

- Conduct independent research in ML applied to Biology while contributing to the overall group's projects
- Conduct independent research in Evolutionary algorithms, RNA-seq data analysis, Drug delivery, and ML techniques for RNA folding and inverse folding
- Supervise assistant research students and get them involved in the group's projects
- Teach Master students first year advanced Python programming for Data Science (website for my teaching materials: `https://fmi08icds.github.io/`).

PhD Student, Max Planck Institute, Leipzig, Germany *09.2018 - 12.2022*

Key contributions:

- Conduct independent research in Evolutionary Computation for RNA direct and inverse folding
- Contribute to developing computational methods needed in ongoing group projects.

Assistant Lecturer, University of Ngaoundéré, Cameroon *12.2017 - 02.2018*

Key contributions: Support students with tutorials in

- advanced SQL and some practical cases using MySQL and PostgreSQL,
- object-oriented database and practical cases using ObjectDB,
- NoSQL and some practical cases using MongoDB.

Private Mathematics Teacher, Cameroon *09.2011 - 05.2012*

Key contributions: Give tutorials in mathematics and physics to class III and upper-level students

SOFTWARE ENGINEERING

Full-stack Java Developer, Afreetech Sarl, Cameroon *08.2017 - 10.2017*

Key contributions:

- Contribute to developing full backend and frontend features of the CUY software
- Develop Java layer based on the Spring-Surf framework and graphical interfaces based on AngularJS
- Contribute to the business logic layer of the CUY software using SpringData and Liquibase.

Full-stack Java Software Engineer, KOOSSERYDESK (Remote) *09.2015 - 02.2018*

Key backend contributions:

- Design and develop the ECM technical server based on Alfresco technology for managing the document contents
- Contribute to the WORKING-SPACE functional server by providing space capabilities for documentary work and relying on ECM and BPM technical servers

Key frontend contributions:

- Develop a full Java layer based on the Spring-surf-MVC framework that communicates with the WORKING-SPACE functional server
- Design full graphical interfaces based on the Sencha-Ext-JS framework that communicates with the Java layer in REST mode.

IT SUPPORT

Assistant Technician, Innovative Technologies Sarl, Cameroon *06.2015 - 09.2015*

Key contributions:

- Manage the hardware and software resources within the company and partner companies
- Install and implement a Free Park Manager (GLPI) within the company's system
- Implement network installation plans for partner clients (FNE, NAFISSA College)
- Organise and supervise the installation of video surveillance cameras at the NAFISSA College
- Administrate and maintain the network systems within the company's system and the partner companies.

MARKETING AND MANAGEMENT

Sales and Promotion Officer, MAYOR, Cameroon *07.2009 - 08.2009*

GRANTS AND AWARDS

- ECIP-CFP ($\approx$ EURO 20,000), ScaDS.AI, Leipzig *06.2026 - 11.2026*
- IMPRS Scholarship, Max Planck Institute for Mathematics in the Sciences, Leipzig *09.2018 - 12.2023*
- AIMS Ghana Scholarship, $\approx$ USD 25,000 *10.2017 - 07.2018*

SCIENTIFIC PUBLICATIONS

PEER-REVIEWED

1. **Nono S.C. Merleau**, et al. Approximately Optimal Search on a Higher-dimensional Sliding Puzzle. *Journal of Heuristics* 32, 28 (2026).
2. Ian A Hatton, et al. (**Nono S.C. Merleau** as co-author). The human cell count and size distribution. *Proceedings of the National Academy of Sciences (PNAS)*, 2023.
3. **Nono S.C. Merleau**, Matteo Smerlak. `aRNAque`: an evolutionary algorithm for inverse pseudoknotted RNA folding inspired by Lévy flights. *BMC Bioinformatics*, 2022.
4. Vaitea Opuu, **Nono S.C. Merleau**, Vincent Messow, Matteo Smerlak. RAFFT: Efficient prediction of RNA folding pathways using the fast Fourier transform. *PLoS Computational Biology*, 2022.
5. **Nono S.C. Merleau**, et al. Why are viral genomes so fragile? The bottleneck hypothesis. *PLoS Computational Biology*, 2021.
6. Igor Haman Tchappi, et al. (**Nono S.C. Merleau** as co-author). Holonification model for a multilevel agent-based system. *Personal and Ubiquitous Computing*, 2019.

PROCEEDINGS

1. Luciana Carota, et al. (**Nono S.C. Merleau** co-author). Experimenting Federated AI Models for Hematological Diseases, *AIBIO*, 2025
2. Francesco Casadei, et al. (**Nono S.C. Merleau** co-author). Survival Model Optimization via Federated Learning: A Study Combining Simulations and Experiment, *IEEE International Conference on Big Data (BigData)*, 2024.
3. Gianluca Asti, et al. (**Nono S.C. Merleau** as co-author). An Artificial Intelligence-Based Federated Learning Platform to Boost Precision Medicine in Rare Hematological Diseases: An Initiative By GenoMed4all and Synthema Consortia. *Blood*, 2024.
4. Vaitea Opuu, et al. (**Nono S.C. Merleau** as co-author). Discovery of RNA-Based Self-Reproducers From an Experimental and Computational Dialogue. *AbSciCon*, 2022.
5. **Nono S.C. Merleau**, Matteo Smerlak. A simple evolutionary algorithm guided by local mutations for an efficient RNA design. *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*, 2021.
6. Ivan P Yamshchikov, **Nono S. C. Merleau**, Igor Samenko, Jürgen Jost. It Means More if It Sounds Good: Yet Another Hypothesis Concerning the Evolution of Polysemous Words. *Proceedings of the 5th International Conference on Complexity, Future Information Systems and Risk (COMPLEXIS)*, 2020.

PREPRINTS

1. **Nono S.C. Merleau** et al. Can transformers learn RNA folding rules or only statistical correlations? *In preparation*, 2026.
2. **Nono S.C. Merleau** et al. DS-GNNs: Decision-Supervised GNNs Learn RNA Secondary Structure *In preparation*, 2026.
3. Federico Alvarez Garcia, et al. (**Nono S.C. Merleau** as co-author). Development, implementation, and validation of an open-source Federated Learning platform to accelerate innovation and boost personalized medicine in rare and ultra-rare haematological diseases: an initiative by GenoMed4All Consortium. *MedRxiv*, 2025 (*Submitted to The Lancet Digital Health Team*).

ONGOING PROJECTS

1. Nono S.C. Merleau and Peter Stadler. Random Forest-Driven RNA Design Tool Selection.
2. Nono S.C. Merleau and Arthur Fleig. Inverse folding of 3D RNA structures using Gaussian Process Regressor (GPR).

TALKS, SEMINARS AND WORKSHOPS

1. Seminar Lecturer on Symbolic Programming and Representation Theory, Thomas Sankara University (UTS), Saaba, Burkina Faso *06.2025*
2. Seminar Lecturer on RNA folding and Computational approaches, African Institute for Mathematical Science (AIMS), Ghana *03.2024*
3. Speaker, Lange Nacht der Wissenschaften, Leipzig, Germany *06.2023*
4. Talk on Computational approaches to RNA folding, ScaDS.AI, Leipzig, Germany *09.2022*
5. Talk on RNA Design and RNA folding dynamics, Benasque RNA Structure Conference, Spain *08.2022*
6. Journées du GDR BIM, Lyon, France *11.2021*
7. Speaker, GECCO Genetic and Evolutionary Computation Conference, France *07.2021*
8. Workshop, GECCO Genetic and Evolutionary Computation Conference, Czech Rep *07.2019*
9. Talk on RNA Design and EAs at AlgoSB Winter School, Marseille, France *01.2019*
10. Talk on novelty search applied to RNA design at the University of Southern Denmark *12.2018*

CERTIFIED COURSES

1. **Deep Learning Specialisation** (deeplearning.ai) *12.2018 - 03.2019*
2. **Complex Analysis** TU Chemnitz (4 ECTS) *02.2018*
3. **SUSE Certified Linux Administrator** (SCLA-1) *01.2015*
4. **LPIC-1: Linux Certified**, LPI000334389. *01.2015*
   Verification code: yfm4sc7a49 · LPI Website: cs.lpi.org

TECHNICAL AND SOFT SKILLS

DATA SCIENCE AND Machine Learning

- **Knowlegde of database management systems**: `MySQL`, `PostgreSQL`, `MongoDB`, and `SQLite`
- **Deep Learning**: `JAX`, `FLAX`, `PyTorch`
- **Data Preprocessing**: `Pandas`, `PyArrow`
- **Data Virsualisation**: `matplotlib`, `seaborn`
- **Numerical Optimisation**: `Numpy`, `Scipy`
- **Statistics**: `scikit-learn`, `statsmodels` and `patsy`

SOFTWARE ENGINEERING

- **Knowledge of programming languages**: `JavaEE`, `Python`, `JavaSE`, `SQL`, `HTML`, `CSS3`, `JavaScript`, `C++`, `C`, `Pascal`, and `Bash`
- **Knowledge of programming frameworks**: `GreenDAO`, `Hibernate`, `mybatis`, `ExtJS`, `Angular`, `ReactJS`, `FreeMarker`, `SpringMVC`, `SpringData`, `Spring-Surf`, `Alfresco`, `Spark` and `Django`
- **Knowledge of modeling languages and tools** `UML`, `GAMAL`, `ArgoUML`, `Visual paradigme` and `Enterprise Architect`
- **Knowledge of web servers**: `XAMP`, `Tomcat` and `Apache`
- **Knowlegde of versioning tools**: `Git` and `SVN`
- **Knowledge of compiling tools**: `Maven`, `Ant`, and `Gradle`

SYSTEMS AND NETWORK ADMINISTRATION

- **Network configuration**: `NFS`, `NAT`, `DHCP`, `DNS`, `SSH`, and Ubuntu Mirror
- **Knowledge of internet protocols**: `TCP/IP`, `ICPM`, and `POP3`
- **Knowledge of network software**: `Postfix`, `Wireshark`, `DHCP3Server`, `Bind9`, `Packettracert`, and `NS3`

LANGUAGES

- **French, English** (fluent)
- **German**: **B2** Level
- **Ghomala, Fulfulde** (mother tongue)

OTHERS

- Teamwork, analytical and synthesis spirit
- Reading, football, basketball, dancing and equal opportunities

REFERENCES

1. **Prof. Dr. Peter F. Stadler** (Current Scientific Advisor)
   Head of Bioinformatics Lab Leipzig, Germany
   Email: studla@bioinf.uni-leipzig.de

2. **Prof. Dr. Ivan P. Yamshchikov** (Research Collaborator)
   Fakultät Informatik und Wirtschaftsinformatik, THWS, Würzburg, Germany
   Email: ivan.yamshchikov@thws.de

3. **Dr. Matteo Smerlak** (Ph.D. Supervisor)
   Capital Fund Management (CFM) Paris, France
   Email: matteo.smerlak@gmail.com

4. **Dr. Vaitea Opuu** (Research Collaborator)
   Institut Pierre-Gilles de Gennes, 6 rue Jean Calvin, Paris
   Email: vaiteaopuu@gmail.com