Curriculum Vitae

Civil Status

Name : Satafa SANOGO,
Age : 10/03/1986 in Darsalamy (Burkina Faso),
Adress : Ouagadougou,
: (00226) 63-95-45-33/ (00226) 66-02-28-31,
: satafa.sanogo@yahoo.fr/ satafa.sanogo@epo.gov.bf.

Education

Août 2023-. . .: **Assistant Professor in Applied Mathematics** at l'Ecole Polytechnique de Ouagadougou (EPO), Burkina Faso,

2020 -23: **Assistant in Mathematics** at l'Ecole Polytechnique de Ouagadougou (EPO).

2019 - 2020: **Temporary Teacher in Mathematics** at Université Nazi Boni (UNB)(ex Université Polytechnique de Bobo (UPB)).

2017 - 2018: **Temporary Teacher in Mathematics** in the department GMM of INSA Toulouse (GMM : Génie Mathématique et Modélisation, INSA : Institut National des Sciences Appliquées).

2016-2017: **French Associate Professor Qualification** Sections CNU 26 and 63.

2015-2016: **Post-Doctorale Research** in XLIM laboratory, University of Limoges (Teams : Formal Calculus (Math) & MINACOM (Physics)).

2012-2016 : **PhD Thesis**, University of Toulouse - Paul Sabatier,
Laboratory: Laplace (**La**boratoire **Pla**smas et **C**onversion d'**É**nergie).

Title: *Optimal Design of Magnetic Circuits Dedicated to Electric Propulsion by Topology Optimization Methods.*
Date of defense: February 1$^{\text{rst}}$, 2016 at Toulouse.

Supervisors : Frédéric MESSINE and Carole HÉNAUX.
Reviewers: Professors Jean-Louis COULOMB and Edouard OUDET.

2011-2012: **Master 2 ACSYON** (Algorithmique, Calcul SYmbolique, et Optimisation Numérique), *with Honor*, University of Limoges, France.

2010-2011: **Maîtrise** (M1) in Apply Mathematics, *with Honor*, **U**niversité **P**olytechnique de **B**obo-Dioulasso (UPB), Burkina Faso.

2009-2010: **Licence** (L3) in Mathematics and Computer Science, *with Honor*, UPB, Burkina Faso.

2008-2009: **DEUG 2** (L2) in Mathematics, Physics and Computer Science, *with Honor*, UPB, Burkina Faso.

2007-2008: **DEUG 1** (L1) in Mathematics, Physics and Computer Science, *with Honor* UPB, Burkina Faso.

2006-2007: **BAC Série C** (Mathematics and Physics), *with Honor*, Lycée Ouezzin Coulibaly, Bobo-Dioulasso, Burkina Faso.

Computer Science and Programming Skills

Scientific Computation Softwares: Matlab, FreeFem++, FEMM, SCILAB.
Writing Softwares : LaTeX, PowerPoint, Word.
Home Source Codes : **ATOP** (**A**lgorithm **T**o **O**ptimize **P**ropulsion).

Languages

English: Scientific Communication,
French: fluent,
Dioula: Native.

Research Fields

- **Topology Optimization** ,
- **Numerical Optimization**,
- **Electromagnetism**,
- **Mathematical Physics**.

Teaching Fields

- **Real Analysis (Calculus I-IV)**,
- **Numerical Analysis & Optimization**,
- **Algebra**,
- **Mathematics for engineers**.

Industrial Experiences

1. **Design of 5 kW Hall Effect Thruster with our tool ATOP^{TO}**

   This work was about the optimal design of magnetic circuits of a 5 kW Hall Effect Thruster (called PPS-5000). This research project was in collaboration with the company specializing in the design and manufacture of space engines, the french society SNECMA-SAFRAN. This work allowed us to set up an extension of our topological optimization program ATOP^{TO} dedicated to this concrete physical problem.

2. **Shape Optimization with `freefem++` for designing microwave components**

   This was a transversal research project win XLIM laboratory and its industrial partners CST (Computer Simulation Technology) Microwave Studio and french national center of spatial studies CNES (Centre National des Études Spatiales). These works concerned the development of models and methods for the simulation and shape optimization of microwave circuits. For this project, we chose the software `freefem ++` for its flexibility in solving electromagnetism problems.

Honors and Awards

1. **Best Paper Award, Track 2**(Energy and Applied Physics for Sustainable Development) during the **IEEE Multi-Conference on Natural and Engineering Sciences for Sahel's Sustainable Development (MNE3SD'24): Special Tribute to Prof. François ZOUGMORE**, held from **November 28–30, 2024**, in **Ouagadougou, Burkina Faso**. Our contribution was about *Numerical Simulation of Flexible Pavement using the Finite Element Method: Global Sensitivity Analysis*.

2. **Second Prize for Best Presentation**, 2nd Edition of the Scientific Days of Ecole Polytechnique de Ouagadougou (EPO), December 2023. The project presented at this conference focused on *Reflections on the Contribution of Mathematics to the Fight Against Terrorism*, with particular emphasis on the context of Burkina Faso.

3. **Prize for contributions to the advancement of science** rewarded by the Ministry of Higher Education, Scientific Research and Innovation (Ministère de l'Enseignement Supérieur, de la Recherche Scientifique et de l'Innovation (MESRSI)) during the XIIIth FRSIT (Forum national de la Recherche Scientifique et des Innovations Technologiques), October, 26-30, 2021.

4. **Prix Jean NOUGARO** (2016) awarded by *Académie des Sciences Inscriptions et Belles Lettres de Toulouse, l'Institut National Polytechnique de Toulouse (INPT)*. I received this award related to my PhD thesis work on the **problem of modeling and optimal design methods of magnetic circuits for Hall effect thrusters**.

5. **Finalist for the Young Researcher Award**, 16th ROADEF Conference (French Society for Operations Research and Decision Support), 2015. Research focused on the design optimization of magnetic circuits using numerical optimization methods. Developed two approaches: a **gradient-based descent algorithm** (local optimization) and a **Branch and Bound algorithm** (global optimization).

Scientific Communications

1 Publications

1. **Satafa Sanogo**, Frédéric. Messine, and C. Henaux, *Topology Optimization Using M-SIMP Approach to Design Electromagnetic Structures*, *Accepted for publication*, Applied Mathematical Modelling, Oct. 2025.
   ✔ https://authors.elsevier.com/tracking/article/details.do?aid=116521&jid=APM&surname=SANOGO

2. **Satafa SANOGO**, Bernard LAMIEN, and Inoussa TOUGRI, *Geometric Shape Optimization of Plasma Thrusters by Solving an Inverse Problem*, Journal of the Brazilian Society of Mechanical Sciences and Engineering, J Braz. Soc. Mech. Sci. Eng. 47, 113 (2025).
   ✔ https://doi.org/10.1007/s40430-025-05409-z

3. **Satafa SANOGO**, and Souleymane ZIO, *Leveraging Artificial Intelligence Based Tools to Improve Educational System in Burkina Faso*, Leveraging Artificial Intelligence Based Tools to Improve Educational System in Burkina Faso," 2024 IEEE Multi-conference on Natural and Engineering Sciences for Sahel's Sustainable Development (MNE3SD), Ouagadougou, Burkina Faso, 2024, pp. 1-8, doi: 10.1109/MNE3SD63831.2024.10812168.
   ✔ https://doi.org/10.1109/MNE3SD63831.2024.10812168

4. Souleymane ZIO, **Satafa SANOGO**, and Mohamed BEIDARI, *Numerical Simulation of Flexible Pavement Using Finite Element Method: Global Sensitivity Analysis*, 2024 IEEE Multi-conference on Natural and Engineering Sciences for Sahel's Sustainable Development (MNE3SD), Ouagadougou, Burkina Faso, 2024, pp. 1-6, doi: 10.1109/MNE3SD63831.2024.10812135.
   ✔ https://doi.org/10.1109/MNE3SD63831.2024.10812135

5. **S. SANOGO**, M. ZONGO, M. BARRO, S. TRAORE, *Robust optimization for quadratic programs with data uncertainty using the concept of stability radius*, Gulf Journal of Mathematics, Vol. 16, No.2, pp. 266–277, 2024.
   ✔ https://doi.org/10.56947/gjom.v16i2.1823

6. Moussa Barro, **Satafa Sanogo**, Mohamed Zongo, and Sado Traoré, *Characterization of Robust Solution Quadratically Constrained Quadratic Optimization Problem Subjected to Data Uncertainty*, Journal of Applied Mathematics and Bioinformatics, Vol. 11, No.1, 2021.
   ✔ https://doi.org/10.47260/jamb/1111

7. **Satafa Sanogo** and Frédéric Messine, *Topology Optimization in Electromagnetic using SIMP Method: Issues of Material Interpolation Schemes*, COMPEL, vol. 37, no. 6, pp. 2138-2157, 04 Nov. 2018.
   ✔ https://doi.org/10.1108/COMPEL-04-2017-0170

8. **Satafa Sanogo** and Frédéric Messine, *Design of space thrusters: a topology optimization problem solved via a Branch and Bound method*, J Glob Optim, vol. 64, no. 2, pp. 273-288, springer, 2016.
   ✔ http://link.springer.com/article/10.1007/s10898-015-0334-z

9. **Satafa Sanogo**, Frédéric. Messine, C. Henaux and R. Vilamot, *Topology Optimization for Magnetic Circuits dedicated to Electric Propulsion*, *IEEE Trans. on Mag*, vol. 50, no. 12, Dec. 2014.
   ✔ http://ieeexplore.ieee.org/document/6857998/

2 Communication in International Conferences with Proceedings

1. **Satafa SANOGO**, and Moussa BARRO, *Shape Optimization for Designing Stationary Plasma Thrusters*, 18th International Conference on Advanced Computational Engineering and Experimenting (ACEX2025) in beautiful Naples, Italy, 30 June - 4 July 2025.
   https://xantec.com.sg/ironix/acex/2025/index.html

2. **Satafa SANOGO**, *Modelling And Shape Optimization For Designing Hall Effect Thrusters*, 5th International Conference on RECENT ADVANCES IN FUNDAMENTAL AND APPLIED SCIENCES (RAFAS 2024), Lovely Professional University, Phagwara, Punjab, 19-20 April 2024.
   https://conferences.lpu.in/rafas/

3. **S. SANOGO**, M. ZONGO, M. BARRO, S. TRAORE, *Robust optimization for quadratic programs with data uncertainty using the concept of stability radius*, International Symposium on Advances in Mathematical Sciences (ISAMS 2024), March 23-24, 2024, Canadian University Dubai, UAE.
   https://isams.org/index.php/isams/about_symposium

4. **Satafa SANOGO**, Bernard LAMIEN, and Inoussa TOUGRI, *Geometric Shape Optimization of Plasma Thrusters by Solving an Inverse Problem*, 11th INTERNATIONAL CONFERENCE ON INVERSE PROBLEMS IN ENGINEERING: THEORY AND PRACTICE (ICIPE 2024), June 23-28, 2024, Búzios, Rio de Janeiro, Brazil.
   https://inverseproblems.org/11th-icipe-2024/

5. **Satafa SANOGO** et *al.*, *The Challenges of Designing Solar Electric Thrusters for Space Mission*, Colloque International en l'honneur du Pr Dieudonné Joseph BATHIEBO "Thème : Energie renouvelables, quel enjeu pour le développement socio-économique de l'Afrique !" Du 27 au 29 Octobre 2021, Université Joseph KI-ZERBO, page : 69.

6. **Satafa Sanogo**, *Algorithme et Code ATOP pour la Conception Optimale de Propulseurs Plasma pour Satellites*, XIIIth FRSIT (Forum national de la Recherche Scientifique et des Innovations Technologiques), October, 26-30th 2021, Ouagadougou, Burkina Faso.
https://anvar.bf/frsit-2021-la-13e-edition-aura-lieu-du-26-au-30-octobre-2021-a-ouagadougou/

7. **Satafa Sanogo**, *Conception Optimale de Propulseurs Plasma*, Rencontre des Jeunes Chercheurs Africains en France 2nd edition, organisé par l'Association pour la Promotion de la Science en Afrique (APSA), 1er et 2 Décembre 2016, à l'Institut Henri Poincaré (IHP), Paris, France.
http://sfp.univ-lille1.fr/rencontreAPSA/

8. **Satafa Sanogo**, Frédéric Messine and Carole Hénaux, *Modeling and Optimal Design Method for Hall Effect Thrusters: M-SIMP Approach*, 10th International Symposium on ELECTRIC AND MAGNETIC FIELDS (EMF), April 12-14 2016, Lyon, France.
http://aimontefiore.org/emf2016/abstracts/154.pdf

9. Pierre Bonnelie, Olivier Ruatta, **Satafa Sanogo**, Stéphane Bila, *Free-Form Method for Designing Optimal Microwave Filters*, 10th International Symposium on ELECTRIC AND MAGNETIC FIELDS (EMF), April 12-14 2016, Lyon, France.
http://aimontefiore.org/emf2016/abstracts/123.pdf

10. Alberto Rossi, Carole Hénaux Frédéric Messine, and **Satafa Sanogo**, *Parametric Optimization of a Hall Effect Thruster Magnetic Circuit*, 34th International Electric Propulsion Conference (IEPC), 30th International Symposium on Space Technology and Science (ISTS), 6th Nano-Satellite Symposium (NSAT), July 4-10, 2015, Kobe, Hyogo, Japan.
http://erps.spacegrant.org/uploads/images/2015Presentations/IEPC-2015-40_ISTS-2015-b-40.pdf

11. **Satafa Sanogo**, Frédéric Messine and Carole Hénaux, *Shape Optimization Method for Designing Stationary Plasma Thrusters*, 13th EUROPT Workshop on Advances in Continuous Optimization, July 8-10, 2015, Edinburgh, Scotland, United Kingdom of Great Britain.
http://www.maths.ed.ac.uk/ jajhall/EUROPT15/Abstracts/Sanogo.pdf

12. **Satafa Sanogo**, Frédéric Messine and Carole Hénaux, *Simultaneous Optimal Design of Materials and Sources Distribution of Electrical Thrusters*, 27th European Conference on Operational Research, July 12-15, 2015 in the University of Strathclyde, EURO 2015, Glasgow, Scotland, United Kingdom of Great Britain.
http://www.theorsociety.com/ygu575kjg/132727_Conference_Guide_USB_v2.pdf

13. **Satafa Sanogo**, Frédéric Messine, and Carole Hénaux, *Topology Optimization for designing Magnetic Circuits using the SIMP approach*, The 16th Biennial IEEE Conference on Electromagnetic Field Computation (CEFC'2014), May 25-28, 2014, Annecy, France, pp. 64.
https://www.ieee.org/conferencesevents/conferences/conferencedetails/index.html?

14. **Satafa Sanogo** and Frédéric Messine, *Design of Space Thrusters : a Topology Optimization Problem solved via a Branch and Bound Method*, Mathematical and Applied Global Optimization 2014 (MAGO'14), XII Global Optimization Workshop (GOW), September 1-4, 2014, Màlaga, Spain, Proceedings of GOW 2014, pp. 121-124.
http://www.hpca.ual.es/ MAGO14/MAGO14-Proceedings.pdf#page=102

15. **Satafa Sanogo** and Frédéric Messine, *Design of Optimal Magnetic Circuits based on Efficient Penalization functions via Material Density Method*, 13th International Workshop on Optimization

and Inverse Problems in Electromagnetism (OIPE), September 10-12, 2014, Delft, The Netherlands, pp. 34-35.
http://www.oipe2014.nl/uploads/File/BookOfDigests.pdf

16. **Satafa Sanogo** and Frédéric Messine, *Topology optimization for the design of electromagnetic devices*, 4th International Conference on Continuous Optimization (ICCOPT 2013), July 27 to August 1, 2013, Caparica, Lisbon, Portugal, pp. 95.
http://mat.uc.pt/∼zhang/docs/conferences/201307-iccopt.pdf

17. **Satafa Sanogo**, Frédéric Messine, Carole Hénaux and Raphaël Vilamot, *Topology Optimization of Electromagnetic Devices : Resolution of Inverse Problems*, Recent Advances on Optimization, July 24-26, 2013, Météo-France Conference International Center, Toulouse, France, pp. 40-42.
http://mat.uc.pt/∼zhang/docs/conferences/201307-toint.pdf

18. Frédéric Messine, **Satafa Sanogo**, Carole Hénaux, et Youness Rtimi, *Design of an Electrical Thruster: a Topology Optimization Problem*, Journée d'Étude: Optimisation topologique Optimisation topologique, École Nationale Supérieure de Techniques Avancées (ENSTA ParisTech), 24 novembre 2016, France.
http://www.sia.fr/evenements/60-optimisation-topologique

19. **Satafa Sanogo**, Frédéric Messine and Carole Hénaux, *Optimisation Topologique basée sur la Méthode M-SIMP pour la Conception Optimale de Circuits Electromagnétiques* , Société de Mathématiques Appliquées Industrielles - Mathématiques de l'Optimisation et de la Décision (SMAI-MODE), 23 - 25 mars 2016, INP-ENSEEIHT Toulouse, France.
https://mode2016.sciencesconf.org/88562/document

20. **Satafa Sanogo**, *Development of Topology Optimization Method and Tool for Designing Electromagnetic Structures*, Colloque Mathématiques, oxygène du numérique, Concours Poster, 20 - 21 Octobre 2016, Université Pierre et Marie Curie (UPMC), Paris, France.
http://www.sciencesmaths-paris.fr/fr/concours-de-posters-809.htm

21. **Satafa Sanogo**, Frédéric Messine aet Carole Hénaux, *Algorithme d'Optimisation Topologique pour la Conception de Circuits Électromagnétiques pour Propulseurs Électriques (PEs) de Satellites*, 16ème Conférence Société Française de Recherche Opérationnelle et Aide à la Décision (ROADEF), Février 25-27, 2015, Marseille, France.
https://www.roadef.org/pdf/AG2015.pdf

22. **Satafa Sanogo**, *Conception Optimale de Circuits Magnétiques pour Propulseurs Électriques par des Méthodes d'Optimisation Topologique*, Congrès de l'école doctorale GEET, GEET-Day, Journée des doctorants, 9 Avril, 2015, Institut National des Sciences Appliquées (INSA) de Toulouse, France.

23. **Satafa Sanogo**, Frédéric Messine et Carole Hénaux, *Optimisation Topologique pour la conception de circuits magnétiques utilisant l'approche SIMP*, Société de Mathématiques Appliquées Industrielles - Mathématiques de l'Optimisation et de la Décision (SMAI-MODE), March 26-28, 2014, Rennes, France.
http://hjnet.math.cnrs.fr/MODE-Rennes.html

3 National Conferences

1. **Satafa SANOGO**, and Souleymane ZIO, *Leveraging Artificial Intelligence Based Tools to Improve Educational System in Burkina Faso*, Leveraging Artificial Intelligence Based Tools to Improve Educational System in Burkina Faso," 2024 IEEE Multi-conference on Natural and Engineering Sciences for Sahel's Sustainable Development (MNE3SD), Ouagadougou, Burkina Faso, 28–30 Novembre 2024.

2. Souleymane ZIO, **Satafa SANOGO**, and Mohamed BEIDARI, *Numerical Simulation of Flexible Pavement Using Finite Element Method: Global Sensitivity Analysis*, 2024 IEEE Multi-conference on Natural and Engineering Sciences for Sahel's Sustainable Development (MNE3SD), Ouagadougou, Burkina Faso, 28–30 Novembre 2024.

3. **Satafa SANOGO**, Frédéric MESSINE and Carole Hénaux, *Structural Optimization: Theory and Applications to Design Stationary Plasma Thrusters*, Workshop sur la modélisation des systèmes complexes 2e édition du 25 au 27 février 2024, Centre de Formation et de Recherche (ex Centre de Calcul) Université Nazi BONI (UNB), Bobo-Dioulasso, Burkina Faso.

4. **Satafa SANOGO**, Aly R. KORBEOGO, Charles YAGUIBOU, *Reflexions sur la Contribution des Mathématiques dans la Lutte Contre le Terrorisme*, JOURNEES SCIENTIFIQUES (JS) ET DES JOURNEES DE RECHERCHE EN INFORMATIQUE (JRI), les 18, 19 et 20 décembre 2023, Ecole Polytechnique de Ouagadougou (EPO), Ouagadougou, Burkina Faso.

5. **Satafa SANOGO**, Moussa Barro, Mohamed Zongo, and Sado Traoré,*Analysis of quadratic optimization problem under data uncertainty by robustness optimization approach*, Premier Collogue International de Mathématiques, Informatique et Applications (CIMIA01), Université Norbert ZONGO (UNZ), Koudougou, Burkina Faso, Du 28 et 29 Juillet 2023.

6. **Satafa SANOGO**, Frédéric MESSINE, Carole HENAUX,*Topological Shape Optimization Methods For Designing Hall Effect Thrusters*, 5ème édition des rencontres Ä", Université Thomas Sankara (UTS), Burkina Faso, Du 20 au 25 Mars 2023.

7. **Satafa SANOGO**, *Méthodes Numériques de Conception Optimale de Propulseurs Electriques*, 6eme édition des Journées Scientifiques de l'Institut de Recherche en Sciences Appliquées et Technologies (IRSAT), "Thème : Contribution des Sciences Appliquées et Technologies à la Résolution des Crises", Du 27 au 28 Octobre 2022, Ouagadougou, Burkina Faso.

8. **Satafa SANOGO**, Frédéric MESSINE, Carole HENAUX, *Méthode d'Optimisation de Forme pour la Conception de Propulseurs Plasma*, Doctoriales de l'Université Joseph KI-ZERBO (UJKZ), "Thème : Les Ecoles Doctorales pour une grande Visibilité des Résultats de la Recherches", du 16 au 18 Février 2022, Université Joseph KI-ZERBO, Ouagadougou, Burkina Faso.

9. **Satafa SANOGO**, Frédéric MESSINE, Carole HENAUX, *Optimisation de Forme des Pièces Polaires d'un Propulseur Plasma*, 1er édition de la conférence scientifique interne de l'Ecole Polytechnique de Ouagadougou (CSI / EPO), 16 Décembre 2022, Salle de Conférence EPO, Ouagadougou, Burkina Faso.

10. **Satafa SANOGO**, Frédéric MESSINE, Carole HENAUX, Souleymane ZIO, Sibiri TIEMOUNOU, Boris W. OUEDRAOGO, André CONSEIBO, *Algorithme et Code ATOP pour la Conception Optimale de Propulseurs Plasma*, XIIIeme Forum national de la Recherche Scientifique et des Innovations Technologiques (FRSIT), "Thème : La recherche scientifique et l'innovation au service de

l'entrepreneuriat et l'employabilité des jeunes et des femmes dans la sous-région ouest-africaine". Du 26 au 30 Octobre 2021, Ouagadougou, Burkina Faso.

Seminars

- *Topology Optimization using M-SIMP Approach to Design Electromagnetic Structures (EMS)*, Department of Mechanical Engineering, COPPE (Instituto Alberto Luiz Coimbra de Pós-Graduação e Pesquisa de Engenharia), UFRJ (Universidade Federal do Rio de Janeiro), Rio de Janeiro, Brazil, 03/07/2024.
- *Méthode d'Optimisation de Forme pour la Conception de Propulseurs Plasma*, Doctoriales - 2022, Université Joseph Ki Zerbo, 16 - 18 Février 2022.
- *Optimisation de Forme des Pièces Polaires d'un Propulseur Plasma*, Conférence Scientifique Interne de l'EPO (Ecole Polytechnique de Ouagadougou) , 16/12/2021.
- *Conception optimale de circuits électromagnétiques pour propulseurs à effet Hall par des méthodes d'optimisation topologique*, Séminaire: Modélisation, Optimisation, Dynamique (MOD), laboratoire XLIM, 29/01/2016.
- *Topology Optimization for Designing Magnetic Circuits using SIMP approach*, Séminaire: Modélisation, Optimisation, Dynamique(MOD), laboratoire XLIM, 31/01/2014.
- *Topology Optimization for electromagnetic circuit dedicated to electric propulsion*, Journée 3EP, laboratoire Laplace, ENSEEIHT, 26/11/2013.

Responsibilities

1. **Director of the Institute of Computer Engineering and Telecommunications (IGIT : Institut du Génie Informatique et Télécommunications)**
   Duration: December 13, 2024 – Present.
2. **Interim Director of the Institute of Computer Engineering and Telecommunications (IGIT)**
   Duration: July 2024 – December 2024.
3. **Deputy Director of the Institute of Computer Engineering and Telecommunications (IGIT)**
   Duration: 2023 – 2024.
4. **Head of the Mathematics and Computer Science Department, IGIT**
   Duration: 2022 – 2023.
5. **Course Coordinator for First Year Engineering Program, IGIT**
   Duration: 2021 – 2022.
6. **Interim Deputy Director of CPGE (Classes Préparatoires aux Grandes Écoles)**
   Duration: November 15–30, 2021.

7. **Co-supervisor** (with Prof. Bawindson Marcel KEBRE) for the **Final Year Project** at École Polytechnique de Ouagadougou (EPO) for engineering student **Michel BAZIE**.

   Title: *Design and Implementation of End-to-End QoS for Mobile and Fixed Broadband: Case Study of Orange Burkina Faso*
   Specialization: Telecommunications Engineering
   Keywords: End-to-End QoS, Service Differentiation, Multi-RAT, Latency, Throughput
   Duration: September 20, 2023 – March 6, 2024.

8. **Co-supervisor** (with Prof. Urbain TRAORE) of the **Master 2 Research in Applied Mathematics**, Mathematics and Computer Science Laboratory (LAMI), Joseph KI-ZERBO University (UJKZ), for student **David OKE**.

   Title: *A Non-Local Model for Reconstructing Images Corrupted by Cauchy Noise*
   Specialization: Analysis and Probability
   Keywords: Cauchy Noise, Image Processing, Filters, Gaussian Noise, PSNR, SSIM, Optimization
   Duration: 2024 – 2025.

9. **Co-supervisor** (with Prof. Sadou TAO) of the **Master 2 Research MAIME** (Applied Mathematics, Computer Science and Environmental Modeling), LANIBIO, Joseph KI-ZERBO University (UJKZ), for student **Biéliémi LAMIEN**.

   Title: *No-Regret and Least-Regret Control of an Ill-Posed Cauchy Problem with Missing Data*
   Specialization: Optimal Control and Applications
   Keywords: No-Regret Control, Least-Regret Control, Missing Data, Approximate Optimality System, Singular Optimality System
   Duration: March – December 2022.

10. **Supervisor** for **Jonas BAGO's** final year project in Statistics and Development Analysis at the National School of Financial Regies (ENAREF : Ecole Nationale des Régies Financières), Ouagadougou, Burkina Faso.

    Title: *Impact Analysis of Standardized Invoicing on the Tax Recovery Performance of the General Directorate of Taxes*
    Keywords: Taxpayers, Standardized Invoice, Difference-in-Differences Model, Fixed Effects Model, Stickers, Tax Revenue, Unit Root Test
    Duration: June – August 2021.

11. Co-supervision (with Frédéric MESSINE) of a Master 2 internship (ACSYON: Algorithmique, Calcul SYmbolique, et Optimisation Numérique, University of Limoges),

    Student: Mohamed MAAMA,
    Subject: *Topology Optimization for Designing Electromagnetic Systems*,
    Keywords: Inverse Problem, Topologique Optimization, Material Interpolation Scheme 2nd degree, Numerical Optimization.
    Year : 2014 - 2015.

12. Co-supervision (with Frédéric MESSINE) of a Master 1 internship (department of electrical and automatic engineering (GEA: Génie Électrique et Automatique), ENSSEIHT, INP Toulouse),

Student: Walid CHMOURI,
Subject: *Optimization of the Mass of an Electromagnetic Device by solving Inverse Problem*,
Keywords: Electromagnetism, Inverse Problem, Constrained Optimization.
Year : 2013-2014.

13. Supervision of projects for L2 (MIC: Modélisation Informatique et Communication, GMM, INSA de Toulouse),

Subject: *The Golden Number ϕ,*
Teams: 1. CAVILLON Ana and THOMAS Alison,
2. DEBBAH B. Yasmine and JACQUIET Morgane,
3. GUILLEMOT Alexandre and AL-AJROUDI Alexandre,
4. GERIER Solene and LAUR Marie,
5. NGUYEN N. Bao, LE VU N. Anh and HUYNH NGO N. Truyen.
Year: 2017-2018.

14. **Co-supervisor** (with Dr. Mohamed BEIDARI) of the **First and Second Year Final Project (PFA1 & PFA2)** in Textile Engineering for **Idrissa PEZACO** and **Kadidjata OUEDRAOGO**, engineering students at the Institute of Industrial and Textile Systems Engineering (IGSIT) of EPO.

Title: *Transformation Process of Cotton Stalks into Organic Fertilizer: An Adaptation Model*
Keywords: Cotton Seeds, Cotton Stalks, Organic Fertilizer
Year: 2024–2025

15. **Co-supervisor** (with Mr. Mahamadi KABRE) of the **First Year Final Project (PFA1)** in Mechanical Engineering for **Téga-Wendé Axel Rodolphe TIENDREBEOGO**, computer engineering student at the Institute of Computer Engineering and Telecommunications (IGIT) of EPO.

Title: *Design of an IoT Solution for Territorial Surveillance in Burkina Faso: Application to Vehicle Monitoring via License Plate Recognition*
Keywords: IoT, Surveillance, Vehicle, License Plate Recognition
Year: 2024–2025

16. **Co-supervisor** (with Mr. Mahamadi KABRE) of the **First Year Final Project (PFA1)** in Mechanical Engineering for **Abass Roufaye BAKOUAN**, computer engineering student at the Institute of Computer Engineering and Telecommunications (IGIT) of EPO.

Title: *Algorithm for Determining Relevant Infractions for Traffic Citation Assignment in a Multi-Mobility Context*
Keywords: Traffic Citations, Decision Model, Multi-Mobility, Algorithm, ICCS (International Crime Classification System)
Year: 2024–2025.

17. **Supervisor** of the **Second Year Final Project (PFA2)** in Textile Engineering for **Yacouba BARGO**, engineering student at the Institute of Industrial and Textile Systems Engineering (IGSIT) of EPO.

Title: *Smart Textile Technologies and Their Applications in Defense and Healthcare*
Keywords: Smart Textiles, Healthcare, Defense, Sports, Sensors
Year: 2022–2023.

18. **Co-supervisor** (with Dr. Inoussa TOUGRI) of the **Second Year Final Project (PFA2)** in Mechanical Engineering for **Bagnomo Benoît BAYALA**, engineering student at the Institute of Industrial and Textile Systems Engineering (IGSIT: Institut du Génie des Systèmes Industriels et Textiles) of EPO.

    Title: *Topological Optimization for the Design of a Mechanical Component*
    Keywords: Topological Optimization, Strain Energy, Compliance
    Year: 2022–2023.

19. **Co-supervisor** (with Dr. Rodrigue W. Rodrigue) of the **First Year Final Project (PFA1)** in Common Core Computer Engineering and Telecommunications for the team of **Judicaël Junior NATAMA Ounténi** and **Cheik Imouran OUEDRAOGO**, engineering students at the Institute of Computer Engineering and Telecommunications (IGIT) of EPO.

    Title: *First Year Engineering Project Report on RFID Chips for Library Management*
    Keywords: Library, RFID Tags, RFID Reader
    Year: 2022–2023.

20. **Participation in the organization of the 6th PhD Workshop** of the XLIM laboratory at the University of Limoges, October 20, 2016.

Research Plan

- **My goal is to deepen my research into Hall-Effect Thruster design, with a specific focus on developing mathematical models for plasma (subatomic particle) interactions and thrust maximization.**
- **I am eager to pursue collaborative opportunities within applied mathematics.**

Ouagadougou (Burkina Faso), on October 28, 2025.

Dr Satafa SANOGO