Sandra Ulrich NGUEVEU

Associate professor

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MAIN RESEARCH INTERESTS

Topics.
- Combinatorial optimization with energy constraints, Vehicle routing with risk management objectives/constraints, Nash equilibrium for multiagent project scheduling problems

Keywords.
- Operations research, Combinatorial optimization, Vehicle routing, Energy
- Metaheuristics, Branch-and-Cut-and-Price, Integer (non) linear programming

AWARDS and ACCREDITATIONS

2018 **Recipient of the 3rd Robert Faure Prize 2018**, *in tribute to Pr. Robert Faure, pioneer of Operations Research in France, it is a triennial prize to recognize significant contributions in mathematical optimization, operations research and graph theory. A special emphasis is given on works that combine new methodological developments with important industrial applications. Awarded by the French OR society to a researcher under 35 years.*

2016 – 2019 **Research and doctoral supervision grant**, *(PEDR)*.

2010 **Qualification for a position as an associate professor**, *by the French Ministry of Research and Education (Conseil National des Universités)*, for scientific sections 27 et 61.

PROFESSIONAL EXPERIENCE

2010 – now **LAAS (laboratory) and INP-ENSEEIHT (engineering school)**, Toulouse, France.
- Associate Professor

2006 – 2010 **LOSI (laboratory) and UTT (engineering school)**, Troyes, France.
- doctoral research fellow + teaching assistant (2006-2009), then research fellow + assistant lecturer

2006 **UNIVERSITY OF CRANFIELD**, United Kingdom.
- Group Project: Lean thinking in the services (with Woburn Safari Park).
- Individual thesis: S&OP processes in France, Germany and the U.K. .

2004 **COVALENCE SAS**, *Paris*, France.
- Junior consultant internship in value analysis and cost reduction

Feb. 2002 **REXAM PLASTIC PACKAGING**, *Troyes*, France.
- Internship as an assistant of the printing department manager

EDUCATION

2006 – 2009 **Ph.D. in Systems Optimization and Dependability**, *at the Laboratory of Industrial Systems Optimization (LOSI)*, Troyes, France.
- Thesis title: Vehicle Routing Problems with Special Constraints for the Risk Management
- Supervisors: Pr. Christian Prins and Pr. Roberto Wolfler Calvo

2005 – 2006 **MSc in Manufacturing Consultancy**, *at University of Cranfield*, United Kingdom.

2001 – 2006 **Engineering degree in Industrial Systems Management**, *at UTT*, France.
- Specialization : Management of Production Systems
- degree obtained concurrently with the MSc in the U.K.

Feb. 2004 **Minor degree in "enterprise creation and management"**, *at UTT*, France.

June 2001 **Baccalauréat C**.
- obtained in Cameroon with mention "Bien" (Good).

MAIN PUBLICATIONS

Peer-reviewed journal articles and book chapters (14)

1. S.U. Ngueveu. Piecewise linear bounding of univariate nonlinear functions and resulting mixed integer linear programming-based solution methods. European Journal of Operational Research, doi:10.1016/j.ejor.2018.11.021, 2018

2. C. Briand, Y. He and S.U. Ngueveu. Computing energy-efficient strategies for assembly-line vehicle supplying. EURO Journal on Transportation and Logistics , doi: 10.1007/s13676-018-0129-8, 2018.

3. R. Bourbon, S. U. Ngueveu, X. Roboam, B. Sareni, C. Turpin, and D. Hernandez-Torres. Energy management optimization of a smart wind power plant comparing heuristic and linear programming methods, Mathematics and Computers in Simulation, doi: 10.1016/j.matcom.2018.09.022, 2018.

4. L. Vargas, N. Jozefowiez and S.U. Ngueveu. A dynamic programming operator for tour location problems applied to the covering tour problem. Journal of heuristics, 23(1), p. 53-80, 2017.

5. S.U. Ngueveu, C. Artigues and P. Lopez. Scheduling under a non-reversible energy source: An application of piecewise linear bounding of non-linear demand/cost functions. Discrete Applied Mathematics, 208, p. 98–113, 2016.

6. S.U. Ngueveu, S. Caux, F. Messine and M. Guemri. Heuristics and lower bound for energy management in hybrid-electric vehicles. 4OR - A Quaterly Journal of Operations Research, 15(4), p.407-430, 2017.

7. C. Briand, S.U. Ngueveu and P. Šůcha. Finding an optimal Nash equilibrium to the multi-agent project scheduling problem. Journal of Scheduling, 20 (5), p.475-491, 2017.

8. R. Baldacci, S.U. Ngueveu and R. Wolfler Calvo. The Vehicle Routing Problem with Transhipment Facilities. Transportation Science, doi: 10.1287/trsc.2016.0711, 2016.

9. D. A. Flores-Garza, M. A. Salazar-Aguilar, S.U. Ngueveu and G. Laporte. The multi-vehicle cumulative covering tour problem. Annals of Operations Research , doi: 10.1007/s10479-015-2062-7, 2015.

10. M. Guemri, A. Neffeti, S. Caux and S.U. Ngueveu. Management of distributed power in hybrid vehicles based on D.P. or fuzzy logic. Optimization and Engineering vol. 15(4), p.993-1012, 2014.

11. S.U. Ngueveu, C. Prins and R. Wolfler Calvo. New lower bounds and exact method for the m-PVRP. Transportation Science, 47 (1), p.38-52, 2013.

12. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. Lower and upper bounds for the m-Peripatetic Vehicle Routing Problem. 4OR - A Quaterly Journal of Operations Research, 8 (4), p.387-406, 2010.

13. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. An effective memetic algorithm for the cumulative capacitated vehicle routing problem. Computers and Operations Research, 37 (11), p. 1877-1885, 2009.

14. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. A hybrid tabu search for the m-peripatetic vehicle routing problem. Matheuristics : hybridizing metaheuristics and mathematical programming, Annals of Information Systems, 10, p. 253-264, 2009.

Papers under review in Journals (3)

1. S.U. Ngueveu, B. Sareni and X. Roboam. Combining piecewise bounding with Integer Linear Programming to solve a water pumping and desalination optimization problem

2. C. Briand, Y. He and S.U. Ngueveu. Computing energy-efficient strategies for assembly-line vehicle supplying.

3. L. Vargas, N. Jozefowiez and S.U. Ngueveu. A Dynamic Programming-Based Meta-heuristic for the m-Covering Tour Problem.

Proceedings of international conferences (LNCS, IEEE, > 7 pages)(17)

1. E. Glize, N. Jozefowiez and S. U. Ngueveu. An Exact Column Generation-Based Algorithm for Bi-objective Vehicle Routing Problems. In: Lee J., Rinaldi G., Mahjoub A. (eds) Combinatorial Optimization. ISCO 2018. LNCS, vol 10856. Springer, Cham

2. A. Cheref, C. Artigues, V. Charvillat, E. Hebrard, M.-J. Huguet, P. Lopez, S.U. Ngueveu and Y. Régent. Algorithme d'approximation pour un problème d'affectation d'une commande multi-produits multi-fournisseurs. In Proceedings of 12th Int. Conference of Modeling, Optimization and Simulation (MOSIM), paper 72, 7p., Toulouse, France, 2018.

3. R. Bourbon, S.U. Ngueveu, X. Roboam and B. Sareni. Heuristic vs linear programming for optimization of micro smart grid energy management. In Proceedings of ELECTRIMACS 2017 Toulouse, France. selected for publication in a special issue of Transactions of IMACS Mathematics and Computers in Simulation

4. A. Cheref, C. Artigues, B. Jean-Charles and S.U. Ngueveu. Integrated production scheduling and delivery routing: complexity results and column generation. In Proceedings of ISCO'2016, Vietri sur Mare, Italy. 4th International Symposium on Combinatorial Optimization.

5. T. Treimuth, D. Delahaye and S.U. Ngueveu. A branch-and-price algorithm for Dynamic Sector Configuration. In Proceedings of ICAOR 2016, Rotterdam, Nederlands, 2016. Applied Air Transport Optimization (AATOPT) workshop at the 8th International Conference on Applied Operational Research.

6. L. Vargas, N. Jozefowiez and S.U. Ngueveu. A Selector Operator-Based Adaptive Large Neighborhood Search for the Covering Tour Problem. Learning and Intelligent Optimization: LNCS 8994, p. 170-185, 2015.

7. G. Scano, M.-J. Huguet and S.U. Ngueveu. Adaptations of k-Shortest Path Algorithms for Transportation Networks. In Proceedings of IESM 2015, Seville, Espagne, 2015. International Conference on Industrial Engineering and

Systems Management.

8. T. Treimuth, D. Delahaye, S. Puechmorel and S.U. Ngueveu. Parallel complexity computation based on dynamical systems. In Proceedings of the 34th IEEE/AAIA Digital Avionics Systems Conference (DASC), p. 1C2-1 - 1C2-8, Prague, Czech Republic, 2015.

9. M. Muguerza, C. Briand, N. Jozefowiez, S.U. Ngueveu, V. Rodríguez and M.U. Moris. A mass-flow MILP formulation for energy-efficient supplying in assembly lines. In Proceedings of MISTA, p. 236-239, Prague, Czech Republic, 2015.

10. M. Guemri, S. Caux, S.U. Ngueveu and F. Messine. A better alternative to dynamic programming for offline energy optimization in hybrid-electric vehicles. In Proceedings of the 11th International Workshop of IEEE ECMSM, p. 1-2, Toulouse, France, 2013.

11. C. Briand, S.U. Ngueveu and P. Šůcha. Solving a cooperative project scheduling with controllable processing times, self-interested agents and equal profit sharing. In Proceedings of MISTA, ISSN 2305-249X, Ghent, Belgium, 2013. Multi-disciplinary scheduling conference.

12. M. Guemri, S. Caux and S.U. Ngueveu. Using Quasi-Newton method for energy management in electrical multi source systems. In Proceedings of Environment and Electrical Engineering (EEEIC), p. 194-199, Venise, Italy, 2012.

13. M. Guemri, S. Caux, S.U. Ngueveu and F. Messine. Heuristics and lower bound for energy management in hybrid-electric vehicles. In Proceedings of 9th Int. Conference of Modeling, Optimization and Simulation (MOSIM), paper 169, 10 pages, Bordeaux, France, 2012.

14. An effective evolutionary algorithm for the cumulative capacitated vehicle routing problem. In Applications of Evolutionary Computing (EvoWorkshops 2009), M. Giacobini et al. (ed.), LNCS 5484, p. 778-787, Springer 2009.

15. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. A memetic algorithm for the cumulative capacitated vehicle routing problem. In Proceedings of EUME08 Conference, Troyes, France, 2008. The European chapter on metaheuristics - EURO Working Group. http ://webhost.ua.ac.be/eume/workshops/eume08/papers/papers.zip.

16. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. A hybrid tabu search for the m-peripatetic vehicle routing problem (m-pvrp). In Proceedings of Matheuristics 2008 Conference, Bertinoro, Italy, 2008. Second International Workshop on Model Based Metaheuristics.

17. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. Bornes supérieures et inférieures pour le problème de tournées de véhicules m-péripatétiques. In Actes de la 7ème conf. internationale de Modélisation et Simulation (MOSIM), 3, p. 1617-1625, Paris, France, 2008.

Extended abstracts at International Conferences (4 pages)(7)

1. E. Glize, N. Jozefowiez and S.U. Ngueveu. Branch-and-price algorithms for bi-objective vehicle routing problems. In Proceedings of Odysseus 2018, Cagliari, Italy, 2018. 7th Int. Workshop on Freight Transportation and Logistics.

2. N. Absi, C. Artigues, S. Kedad-Sidhoum, S U. Ngueveu and O. Saadi. Lot-Sizing Models for Energy Management. In Proceedings of IWLS'2017, p.45-48, Glasgow, Scottland, 2017. 8th International Workshop on Lot Sizing.

3. E. Glize, N. Jozefowiez and S.U. Ngueveu. Branch-and-price algorithms for the Bi-Objective Vehicle Routing Problem with Time Windows. In Proceedings of MOPGP 2017, 4 pages, Metz, France, 2017. 12th International Conference on Multiple Objective Programming and Goal Programming.

4. R. Baldacci, S.U. Ngueveu and R. Wolfler Calvo. Branch-and-Cut-and-Price for the Vehicle Routing Problem with Transshipment Facilities. In Proceedings of Odysseus 2015, Ajaccio, France, 2015. 6th International Workshop on Freight Transportation and Logistics.

5. R. Baldacci, S.U. Ngueveu and R. Wolfler Calvo. Branch-and-Cut for the Vehicle Routing problem with Intermediate Facilities. In Proceedings of TRISTAN VIII, San Pedro de Atacama, Chile, 2013. 8th Triennial Symposium on Transportation Analysis.

6. S.U. Ngueveu and M. Lacroix. Flow-based mathematical formulation and strengthening cuts for Cumulative CVRP. In Proceedings of Odysseus, p.87-90 , Mykonos, Greece, 2012.

7. S.U. Ngueveu, C. Prins and R. Wolfler-Calvo. New lower bounds and exact method for the m-PVRP. In Proceedings of TRISTAN VII, Tromsø, Norway, 2010. 7th Triennial Symposium on Transportation Analysis.

CURRENT PARTICIPATION IN FUNDED PROJECTS

2018 – now **PGMO project**.
- Topic: Hybrid Optimization for Hydro Valleys (HYBOPTHYD)
- Participants: LAAS (project leader = S.U. Ngueveu), CEDRIC (Paris), LIMOS (Gardanne)
- Industrial partner: EDF

2016 – now **FEDER (European union funding) + Regional funded project**.
- Topic: One Stock Performance
- Participants: LAAS (local correspondant = S.U. Ngueveu)
- Industrial partner: DEVATICS

2016 – now **ANR BLANC project**.
- Topic: Co-modal freight transportation chains: an approach based on physical internet
- Participants: INRIA (Lille), Mines (Paris), LAAS
- Industrial partner: DHL

SUPERVISING

2016 – now   **Ph.D. thesis of Estèle Glize**.
- Topic: Branch-and-price algorithms for multi-objective vehicle routing problems
- co-supervision with Dr. Nicolas Jozefowiez from LAAS

April. 2017 –
Aug. 2018   **Postdoc of Azeddine Cheref**.
- Topic: Location and assignment problems for e-commerce
- co-supervision with Dr. C. Artigues/E. Hebrard from LAAS + industrial partner DEVATICS

2013 – 2018   **Ph.D. thesis of Tambet Treimuth**.
- Topic: Optimization of the regrouping of air traffic sectors
- co-supervision with Pr. D. Delahaye from ENAC (French Civil Aviation University)

2013 – 2016   **Ph.D. thesis of Leticia Gloria Vargas Suarez**.
- Topic: Multiobjective Cumulative Covering Routing Problems for Humanitarian Logistics
- co-supervision with Dr. Nicolas Jozefowiez from LAAS

2013 – 2016   **Ph.D. thesis of Grégoire Scano**.
- Topic: Development of algorithms for the computation of multimodal itineraries and car-sharing
- co-supervision with Dr. Marie-José Huguet from LAAS + industrial partner MOBIGIS

2010 – 2013   **Ph.D. thesis of Mouloud Guemri**.
- Optimized and robust heuristics for resolution of energy management pb in hybrid electric vehicles
- co-supervision with Pr. Stéphane Caux from LAPLACE (Toulouse).

OTHER RESEARCH-RELATED ACTIVITIES

Member of a PhD thesis jury

2018 External examiner for PhD defense of Quentin Viaud (INRIA, Bordeaux, France).
- Mathematical programming methods for complex cutting problems

2018 External examiner for PhD defense of Jérémy Bourdon (LAPLACE, Toulouse, France).
- Optimal Design Methodology for Static Converters - Application to the Aeronautical Context

2016 Member of the jury for PhD thesis and defense of Nestor Cid (UANL, Mexico)
- Exact solutions for the agricultural and the two-dimensional packing problems

2014 External reviewer for PhD thesis and defense of Maite B. Bengoa (Mondragon Unibertsitatea, Spain).
- Design and implementation of dynamic genetic algorithms for lift group control with passenger information to improve time and energy performance with adaptation to traffic patterns.

2013 External examiner for PhD defense of Julien Michallet (LOSI, Troyes, France).
- Periodic vehicle routing problem with time windows and time spread constraints on services

Member of the scientific committee for a national conference

- ROADEF 2015 (Marseille), ROADEF 2019 (Le Havre)

Referee for International Journals

- Computers and Operations Research, European Journal of Operational Research, Journal of Heuristics, Journal of Scheduling, Networks, RAIRO, Transportation Science, Applied Mathematical Modelling, EURO Journal on Computational Optimization, Journal of the Operational Research Society

Organising committees / Sessions organisation / Chairman at (inter-)national conferences

- national conf. ROADEF : 2012 (Angers), 2013 (Troyes), 2017 (Metz), 2018 (Lorient)
- international conf. : EURO XXIV (Lisbon, Portugal), ISMP 2018 (Bordeaux, France)
- member of organizing committees for int. conf. : ELECTRIMACS 2017 (Toulouse), MOSIM 2018 (Toulouse)

Memberships

- ROADEF (French Operations Research Society), since 2007
- EU/ME (The metaheuristics community) since 2009
- VEROLOG (EURO working Group on Vehicle Routing and Logistics Opt.), since 2011
- TORO (Toulouse Operations Research and Optimization) since its foundation in 2011

Others

- Board member of the doctoral school EDSYS
- Appointed member of the laboratory council for LAAS
- Member of the steering commitee of the ENERGY strategic axis of the LAAS
- Responsible for the Operations Research Master degree at ENSEEIHT (http://m2rit-ro.recherche.enac.fr/index.php)