



Offer #2024-07349

PhD Position F/M 15 PhDs on Tensor Modelling, Geometry and Optimisation

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Other valued qualifications : Master or equivalent

Fonction : PhD Position

Level of experience : From 3 to 5 years

About the research centre or Inria department

The Inria centre at Université Côte d'Azur includes 37 research teams and 8 support services. The centre's staff (about 500 people) is made up of scientists of different nationalities, engineers, technicians and administrative staff. The teams are mainly located on the university campuses of Sophia Antipolis and Nice as well as Montpellier, in close collaboration with research and higher education laboratories and establishments (Université Côte d'Azur, CNRS, INRAE, INSERM ...), but also with the regional economic players.

With a presence in the fields of computational neuroscience and biology, data science and modeling, software engineering and certification, as well as collaborative robotics, the Inria Centre at Université Côte d'Azur is a major player in terms of scientific excellence through its results and collaborations at both European and international levels.

Context

TENORS (Tensor modElinG, geOMetRy and optimiSation) is a Marie Skłodowska-Curie Doctoral Network / Joint Doctorate (2024-2027), offering **15 PhD positions**.

The objective of TENORS is to conduct advanced research that addresses critical challenges in the fields of **tensor modeling and computation**, joining forces from **algebraic geometry, global optimisation, numerical computation, high performance computing, data science, quantum physics**.

It aims to feed an innovative and ambitious **joint-PhD program** to train highly qualified young scientists in new scientific and technological knowledge. The PhD candidates will obtain joint/double PhD diplomas from reputed universities within TENORS project.

The network partners are:

- Inria, Sophia Antipolis, France
- CNRS/LAAS, Toulouse France
- University of Konstanz, Germany
- Max Planck Institute, Germany
- The Arctic University of Norway
- University of Trento, Italy
- University of Florence, Italy
- NWO-I/CWI, Amsterdam, the Netherlands
- Czech Technical University in Prague
- Institut of Photonic Science, Spain
- Artelys SA, Paris, France

The associate partners are:

- Quandela, France
- Cambridge Quantum Computing Limited, UK
- BlueTensor, Italy
- Arva, Norway
- HSBC, UK
- Université Côte d'Azur, France
- University of Tilburg, the Netherlands
- Université Toulouse III-Paul Sabatier, France
- Leipzig University, Germany
- Universitat Politècnica de Catalunya, Spain

Benefits

Marie Skłodowska-Curie PhDs are paid a competitive gross salary of 3,400 €/month, adjusted for their host country, a Mobility Allowance of 600 €/month and, for researchers who have a family, a Family Allowance of 660 €/month. All amounts are subject to deductions and taxes. Family is defined as persons linked to the researcher by (i) marriage, or (ii) a relationship with equivalent status to a marriage recognised by the national legislation of the country of the beneficiary or of nationality of the researcher, or (iii) dependent children who are actually being maintained by the researcher; family status is determined at recruitment and does not evolve.

Main activities

List of PhD topics

[DC 1: Geometry of extensor varieties](#)

Advisor: B. Mourrain (Inria), A. Bernardi (University of Trento)
Recruitment place: Inria d'Université Côte d'Azur, France
Secondment place: University of Trento (10 months), BlueTensor (2 months)
Joint degree: Université Côte d'Azur, University of Trento

[DC 2: Low-rank approximation for tensor modeling](#)

Advisor: A. Mantzaflaris (Inria), C. Giannelli (University of Florence)
Recruitment place: Inria d'Université Côte d'Azur, France
Secondment place: University of Florence (10 months), Artelys (2 months)
Joint degree: Université Côte d'Azur, University of Florence

[DC 3: Tropicalization of moment relaxations for tensor decompositions](#)

Advisor: M. Skomra (LAAS/CNRS), S. Kuhlmann (University of Konstanz)
Recruitment place: CNRS, France
Secondment place: University of Konstanz (10 months), Artelys (2 months)
Joint degree: Université Toulouse III-Paul Sabatier, University of Konstanz

[DC 4: Cohomology of tensor varieties](#)

Advisor: M. Michałek (University of Konstanz), G. Ottaviani (University of Florence)
Recruitment place: University of Konstanz, Germany
Secondment place: University of Florence (13 months)
Joint degree: University of Konstanz, University of Florence

[DC 5: Tensor decompositions for sums of even powers of real polynomials](#)

Advisor: S. Kuhlmann (University of Konstanz), B. Mourrain (Inria)
Recruitment place: University of Konstanz, Germany
Secondment place: Inria (10 months), UiT The Arctic University of Norway (2 months)
Joint degree: University of Konstanz, Université Côte d'Azur

[DC 6: Gibbs manifolds and semidefinite programming](#)

Advisor: B. Sturmfels (The Max-Planck-Gesellschaft), S. Telen (The Max-Planck-Gesellschaft), M. Laurent (NWO-I)
Recruitment place: Max Planck Institutes, Germany
Secondment place: NWO-I (11 months), HSBC Lab (2 months)
Joint degree: University of Leipzig, University of Tilburg

[DC 7: Tensor decomposition with group invariance](#)

Advisor: H. Munthe-Kaas (UiT The Arctic University of Norway), C. Riener (UiT The Arctic University of Norway), E. Hubert (Inria)
Recruitment place: UiT The Arctic University of Norway
Secondment place: Inria (12 months)
Joint degree: UiT The Arctic University of Norway, Université Côte d'Azur

[DC 8: Tensor optimization for storage integration](#)

Advisor: C. Bordin (UiT The Arctic University of Norway), C. Riener (UiT The Arctic University of Norway), M. Schweighofer (University of Konstanz)
Recruitment place: UiT The Arctic University of Norway
Secondment place: University of Konstanz (9 months), Arva (3 months)
Joint degree: UiT The Arctic University of Norway, University of Konstanz

[DC 9: Algorithms for Tensor Decomposition](#)

Advisor: A. Bernardi (University of Trento), A. Oneto (University of Trento), B. Mourrain (Inria)
Recruitment place: University of Trento, Italy
Secondment place: Inria (11 months), BlueTensor (2 months)
Joint degree: University of Trento, Université Côte d'Azur

[DC 10: Geometry of tensor network varieties for quantum condensed matter physics](#)

Advisor: I. Carusotto (INO-BEC, CNR), S. Telen (The Max-Planck-Gesellschaft)
Recruitment place: University of Trento, Italy
Secondment place: The Max-Planck-Gesellschaft (10 months), Quandela (3 months)
Joint degree: University of Trento, University of Leipzig

[DC 11: Geometry of Hermitian tensor spaces](#)

Advisor: G. Ottaviani (University of Florence), Yang Qi (Inria), B. Mourrain (Inria)
Recruitment place: University of Florence, Italy
Secondment place: Inria (10 months)
Joint degree: University of Florence, Université Côte d'Azur

[DC 12: Approximation hierarchies for quantum entanglement detection](#)

Advisor: M. Laurent (NWO-I), V. Magron (LAAS/CNRS)
Recruitment place: NWO-I, the Netherlands
Secondment place: LAAS/CNRS (10 months), Quantinuum (2 months)
Joint degree: University of Tilburg, Université Toulouse III-Paul Sabatier

[DC 13: State preparation of matrix-product operations](#)

Advisor: J. Marecek (Czech Technical University), D. Henrion (LAAS/CNRS), M. Korda (LAAS/CNRS)

Recruitment place: Czech Technical University, Czech Republic

Secondment place: LAAS/CNRS (9 months), HSBC Labs (3 months)

Joint degree: Czech Technical University, Université Toulouse III-Paul Sabatier

[DC 14: Tensor and polynomial optimisation for quantum information networks](#)

Advisor: A. Acin (The Institute of Photonic Sciences), V. Magron (LAAS/CNRS)

Recruitment place: The Institute of Photonic Sciences, Spain

Secondment place: LAAS/CNRS (10 months), Quandela (2 months)

Joint degree: Universitat Politècnica de Catalunya, Paul Sabatier University

[DC 15: Constrained Optimization with Low-Rank Tensor Approximations](#)

Advisors: F. Oztoprak Topkaya (Artelys), M. Gabay (Artelys), B. Mourrain (Inria), C. Riener (University of Trento)

Recruitment place: Artelys, France

Secondment place: University of Trento (12 months)

Joint degree: Université Côte d'Azur, University of Trento

Skills

Eligibility criteria

To apply for one of these PhD positions, the applicant should fulfill the following conditions:

- Have — **at the date of recruitment** — a Master's degree in Computer Science, Mathematics or Engineering (or any equivalent diploma).
- **Trans-national mobility:** The applicant — **at the date of recruitment** — should not have resided in the country where the research training takes place for more than 12 months in the 3 years immediately prior to recruitment, and not have carried out their main activity (work, studies, etc.) in that country. For refugees under the Geneva Convention ([1951 Refugee Convention](#) and the 1967 Protocol), the refugee procedure (i.e. before refugee status is conferred) will not be counted as 'period of residence/activity in the country of the beneficiary'.
- Be able to communicate fluently in English (speaking and writing). Oral interview with the prospective advisor may be required.

Note: A Master's degree (or equivalent) is not necessary at the time of the application, but will be required at the date of recruitment (in September or October 2024).

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Contribution to mutual insurance (subject to conditions)

Remuneration

Duration: 36 months

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General Information

- **Theme/Domain :** Algorithmics, Computer Algebra and Cryptology
Scientific computing (BAP E)
- **Town/city :** Sophia Antipolis
- **Inria Center :** [Centre Inria d'Université Côte d'Azur](#)
- **Starting date :** 2024-03-01
- **Duration of contract :** 3 years, 7 months
- **Deadline to apply :** 2024-12-31

Contacts

- **Inria Team :** [AROMATH](#)
- **PhD Supervisor :**
Mourrain Bernard / Bernard.Mourrain@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

Selection process

To apply for one of these positions, submit at <https://easychair.org/conferences/?conf=tenors2427> a single pdf document containing

- a detailed CV including education, work experience, skills, dissertations, research interests, career objectives, and — **if available at the date of submission** — names and contact details of two referees, that can include the supervisor of the master thesis, willing to provide confidential letters of recommendation, a list of publications if any;
- a letter of motivation regarding the position as well as the TENORS network;
- a transcript of the master studies' grades (including the overall grade and an explanation of the grading system) and the master's thesis **if available**;
- **and indicate as TITLE your full name, add 3 KEYWORDS, and chose the TOPICS you are interested in (ALL, DC1, ..., DC15, see below).**

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

To apply for one of these positions, submit at <https://easychair.org/conferences/?conf=tenors2427> a single pdf document containing

- a detailed CV including education, work experience, skills, dissertations, research interests, career objectives, and — **if available at the date of submission** — names and contact details of two referees, that can include the supervisor of the master thesis, willing to provide confidential letters of recommendation, a list of publications if any;
- a letter of motivation regarding the position as well as the TENORS network;
- a transcript of the master studies' grades (including the overall grade and an explanation of the grading system) and the master's thesis **if available**;
- **and indicate as TITLE your full name, add 3 KEYWORDS, and chose the TOPICS you are interested in (ALL, DC1, ..., DC15, see below).**

Defence Security :

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy :

As part of its diversity policy, all Inria positions are accessible to people with disabilities.