GeoBot: Subterranean Wireless Localization

Open Research Engineer/Postdoc position

Admin

- Type of position: Research Engineer or Postdoc *(both apply, see below)*
- Location: Inria-Paris, France
- Supervisor: Thomas Watteyne, PhD
  thomas.watteyne@inria.fr
- Keywords: localization, wireless, experimental
- Inria Team: EVA
  https://team.inria.fr/eva/
- Overarching project: FUI GeoBot (https://geobot.fr/)
- Application deadline: The position is available immediately and needs to be filled quickly. Evaluation of applications will begin immediately and continue until the position is filled. **Candidates are encouraged to apply now**.
- Expected start date: ideally 1 November 2018
- Duration: until end September 2020

Working at Inria

Established in 1967, Inria is the only public research body fully dedicated to computational science. Combining computer sciences with mathematics, Inria's 3,500 researchers strive to invent the digital technologies of the future. Educated at leading international universities, they creatively integrate basic research with applied research and dedicate themselves to solving real problems, collaborating with the main players in public and private research in France and abroad, and transferring results to innovative companies. Inria researchers have published over 4,500 articles in 2013 and are behind over 270 active patents and 110 start-up companies. In 2013, Inria's budget was 235 million euros, 25% of which represented its own resources. The 180 project teams are distributed in eight research centers located throughout France.

The brand new Inria-Paris research center is located in the heart of Paris. Thanks to its top-quality researchers and numerous international guests, the Inria-Paris research center plays a leading role in international research, with a strong focus on networking and communication systems. The 41 research teams of the center are continuously pushing the boundaries in developing new concepts and techniques.

In 2015, Glassdoor ranked Inria the #1 company in France for the wellbeing of its employees[1].

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[1] http://business.lesechos.fr/directions-ressources-humaines/02180452763-l-inria-l-entreprise-la-plus-soucieuse-de-ses-salaries-111361.php

EVA (https://team.inria.fr/eva/) is a leading research team in low-power wireless communications. The research team is designing Tomorrow's Internet of (Important) Things. The team pushes the limits of low-power wireless mesh networking by applying them to critical applications such as industrial control loops, with harsh reliability, scalability, security and energy constraints. EVA co-chairs the IETF 6TiSCH standardization working group and co-leads Berkeley's OpenWSN project. EVA is also heavily involved in real-world applications, and oversees over 1,000 sensors deployed on 3 continents for smart agriculture, smart city and environmental monitoring applications. The team is associated with Prof. Glaser's (UC Berkeley), Prof. Kerkez' (U. Michigan) and Prof. Krishnamachari's (USC) teams.

Description of the work

This position is part of the FUI GeoBot project (https://geobot.fr/), one of the most innovative, challenging and fun projects around wireless localization in the world today. It applies true innovation to a real-world problem, with a clear target application (and customer) in mind.
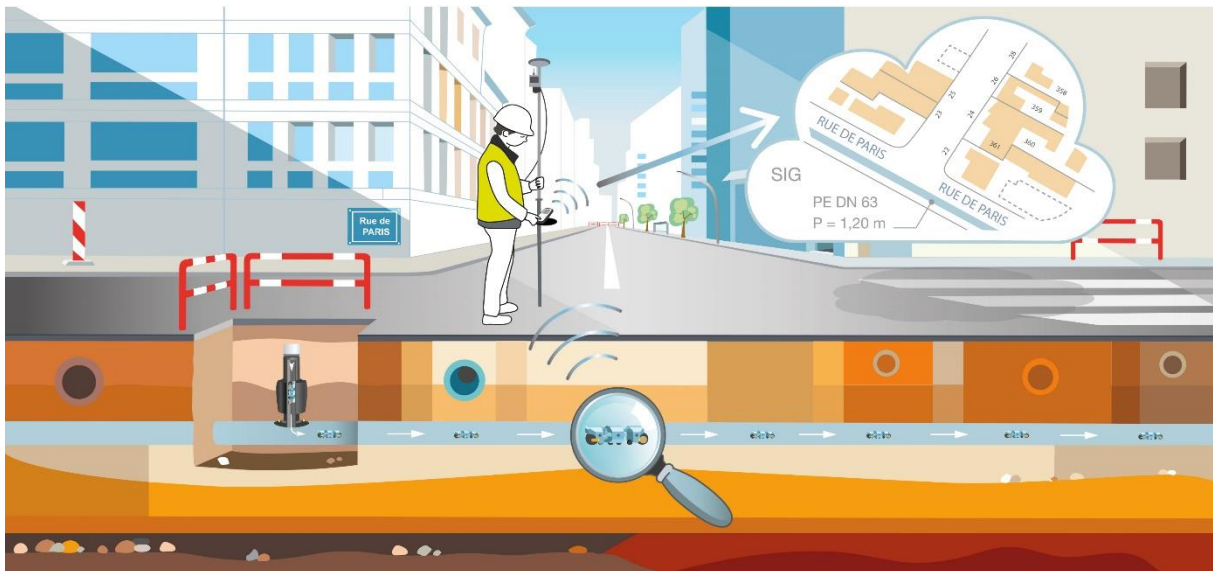
The GeoBot partners are building a small robot (think of a matchbox-sized RC car) that will be inserted into a gas pipe, and move around it to map the location of the different underground pipes. Such mapping is necessary to prevent gas-related accidents, for example during construction. At the end of the project, this solution will be commercialized and used to map the network of gas pipe in France, before being used in worldwide.

Each partner is in charge of a different aspect of the problem: robotics, analysis of the inertial data, visualization, etc. Inria is in charge of the wireless part. We will be equipping the robot with a wireless chip(set) in order to

- communicate with the robot as it moves about in the pipes while standing on the surface
- discover the relative localization of the robot w.r.t. a person on the surface.

In practice, Inria will be evaluating different wireless technologies, benchmarking around ranging accuracy and capabilities to communicate. We will start from off-the-shelf kits from different vendors to eventually build a custom board, benchmark it, and integrate it with the other partners of the project.

If you are so inclined, you will have ample opportunity to conduct cutting-edge research (and publish!) around the project, wireless ranging/localization, and IoT in general, from one of the most vibrant research teams in the field.

Skills and Expertise

We are looking for an advanced engineer or a postdoctoral researcher ready to make a significant contribution to the field of wireless ranging and localization.

- The position is open to both Engineers (i.e. you have an Engineer and/or Masters degree) and Postdoctoral researchers (i.e. you have a PhD degree) in Computer Science, Telecommunications, Electrical Engineering or related field.
- We ask for min. 2 years of expertise in low-power wireless networks (mesh networks, WSNs, etc.)
- strong "hard" skills
    - very good programming skills and experience (C/Python/Java, etc.), including web development (server-side, JavaScript, PHP, html, etc.)
    - general understanding of software quality and project management tools (Git, GitHub, Travis-CI, Jenkins, etc)
    - some embedded programming experience (micro-controllers such as MSP430, Cortex-M) ideally involving low-power wireless devices
    - ideally, experience with IoT and wireless (ranging) solutions, including IEEE802.15.4, Ultra Wide Band, ultrasound, ToA, etc.
    - for postdocs, proven expertise in the general topic of wireless ranging and locaslization.
- strong "soft" skills
    - we are looking for the "technical leader" type. If you have participated in open-source projects, have lead a software development team, tell us about it!
    - ideally, some open-source project experience, including source code and project management tools (Git, GitHub, Travis-CI, etc)

Environment

You will work in a fantastically fun environment, within the EVA team (https://team.inria.fr/eva/), but also in constant collaboration with the other partners of project, and with other international research teams.

Some pointers about the projects the EVA team is involved in:

- Team Homepage: https://team.inria.fr/eva/
- Thomas Watteyne's homepage: www.thomaswatteyne.com
- IETF 6TiSCH working group: https://tools.ietf.org/wg/6tisch/
- open-source 6TiSCH implementation: www.openwsn.org
- Back-end system: http://solsystem.io/
- Smart Agriculture deployment in Argentina: http://www.savethepeaches.com/
- Environmental deployment in California: http://snowhow.io/
- Smart city deployment in the French Riviera: http://smartmarina.org/

Benefits

Located at the heart of Europe, Paris is a unique place to work and live in. Inria offers a unique balance between working in a leading research center, and living in one of the most beautiful and bustling cities in the world. A real communication hub, Paris is a gateway to France and Western Europe, and working in the Inria-Paris research center is real asset to your career.

- Competitive salary
- Medical coverage
- approx. 45 days of annual vacation
- Inria covers part of your commute expenses (metro, bus, etc.)
- When needed, Inria will help you apply for Scientific Resident card and a visa
- on-site restaurant (Inria pays for part of you expenses)
- optional French classes (free)

How to apply

Send your CV and cover letter to thomas.watteyne@inria.fr with the subject "[GeoBot] application". Don't hesitate to ask clarifying questions before applying.

Evaluation of applications will begin immediately and continue until the position is filled. **Candidates are encouraged to apply now**.

Note well

- Speaking French is not a requirement, but a plus.
- In the interests of protecting its scientific and technological assets, Inria is a restricted-access establishment. Consequently, it observes special regulations for welcoming foreign visitors from outside of the Schengen area. The final acceptance of each candidate thus depends on applying this security and defense procedure.