

1 PhD and 1 Postdoc position in  
"Low-power Networking and Localization with Ultra-wideband (UWB)"  
at Univ. of Trento, Italy  
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Applications are invited from those interested in pursuing a PhD or a postdoc in computer science in the research group of Prof. Gian Pietro Picco, at the University of Trento, Italy.

=== CONTEXT

Ultra-wideband (UWB) radios are rapidly gaining popularity, as they can estimate distance (ranging) with great accuracy (<10cm error). This enables countless applications based on proximity and localization, even in GPS-denied environments like indoor. Major vendors like Apple and Samsung have already equipped their latest smartphone models with UWB, which is expected to become as commonplace as WiFi and BLE.

=== AIM AND SCOPE

The candidates will explore research themes at the intersection of networking and localization. These include novel schemes to efficiently coordinate and harmonize the two in a single protocol stack, but also novel techniques that improve the two dimensions separately. Particular emphasis will be given to techniques exploiting concurrent transmissions.

The activities carried out can be characterized as "systems research". Novel ideas and contributions are embodied in prototypes concretely demonstrating feasibility and improvements over the state of the art. Typical performance metrics include energy efficiency, ranging/positioning accuracy, reliability, and scalability w.r.t. users and sample rate. Analytical models are used to characterize the performance of prototypes, which is then evaluated experimentally in realistic setups. In this respect, the group offers unique assets, including a 130-node (~8000sqm) indoor UWB testbed and two accurate (mm-level) optical facilities.

=== CANDIDATE PROFILE

A good candidate has:

1. knowledge about low-power wireless communications (e.g., IEEE802.15.4, LoRa, BLE);
2. hands-on experience with networked embedded systems programming (e.g., ContikiOS, myNewt, Zephyr), possibly including in-field deployment;
3. (ideal but not necessary) knowledge and experience of UWB concepts and systems (e.g., Decawave transceivers);
4. fluent written and spoken English, the language of the research group;
5. the ability to work collaboratively in a team with both senior and junior people, as well as external project collaborators;
6. strong passion and commitment to research.

Postdoc candidates are additionally expected to show an established research record, including publications in major conferences and journals in research fields related with the topics above.

=== PHD POSITION: TERMS AND PROCEDURE

PhD students receive a monthly salary via a scholarship that includes additional benefits (e.g., personal funds, accommodation, etc.). Details are available here:  
<https://ict.unitn.it/prospective-student/benefits-services>

The candidate must fill an application to the call at  
<https://iecs.unitn.it/education/admission/call-for-application>  
by APRIL 15, 2021 at 16:00 (CEST).

IMPORTANT: you *must* select both the Project specific grant (Reserved Topic Scholarship) titled "Low-power Localization for the Internet of Things (IoT)" (label B1) *and* "Area D (Curriculum 2:

Telecommunications)" as your preferred ones.  
Failure to do so results in ineligibility for the PhD position described here.

Admission to the PhD program occurs via a selection, performed by the School, based on the evaluation of the candidate's titles and qualifications. The candidate must hold a Master's degree or equivalent by October 31, 2021.

The PhD will formally begin on November 1st, although an earlier arrival (funded by a pre-phd scholarship) can be arranged.

Further information is available on the website of the Doctoral School (<http://ict.unitn.it>).

=== POSTDOC POSITION: TERMS AND PROCEDURE

The monthly salary ranges from 2000 to 2400 EUR (\_net\_ income), depending on the candidate seniority and qualifications.

The contract is for a minimum of one year, and is renewable yearly. A longer duration of the first contract can be negotiated.

The position is available immediately and will remain open until filled. Please contact directly prof. Picco for further information.

=== INQUIRIES AND CONTACT PERSON

Candidates interested in either position should contact directly Prof. Gian Pietro Picco and provide a curriculum vitae including three references in PDF format.

Prof. Gian Pietro Picco  
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University of Trento  
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=== RESEARCH TEAM

The research team has a long-standing track record in the general field of low-power wireless systems and networks. Topics span the entire application stack, including middleware and programming abstractions, networking protocols, ranging and localization schemes, in-field deployment issues. The high quality of the research output is witnessed by several best paper and other scientific awards.

The research team favors a mix of curiosity-driven and application-driven research. New PhD students are also invited to participate in ongoing funded projects, to gain experience and insights from real systems and use cases, and identify novel and challenging problems whose solution breaks new ground. Examples of past and ongoing projects involving UWB include: asset tracking for logistics, monitoring people trajectories, drone-based localization, social contact tracing, and rover navigation in planetary exploration.

Candidates are encouraged to look at the publications of prof. Picco (see link above) to get an idea of the type of research performed. Recent publications on UWB include several top venues (EWSN'18, IPSN'19, SECON'19, IROS'19, IPIN'19, EWSN'20, SenSys'20, ACM TOSN).

=== WORKING ENVIRONMENT

The Department of Information Engineering and Computer Science (DISI) is a leading and fast-growing research institution, characterized by a young and international faculty and by a large, international student population. Indicators for scientific production place the department among the top in Europe. The Department and PhD school closely collaborate with, and operate in, a rapidly growing research and innovation environment characterized by top-class research centers and an increasing number of industrial research labs, including the

Italian co-location center of the European Institute of Innovation and Technology (EIT). More information at the websites of DISI (<http://disi.unitn.it>) and its Doctoral School (<http://ict.unitn.it>)

### === LOCATION

Trento is a beautiful city of ~120,000 people, located ~130km south of the border between Italy and Austria. It has a well-preserved historic center and is consistently ranked among the top cities in Italy for quality of life. Further, it is the ideal starting point for day trips to famous towns like Venice and Verona, or to the many natural attractions nearby. Trentino, the wider territory surrounding Trento, is well-known for its many beautiful mountains and lakes, and offers a variety of cultural and sports opportunities all year round, as well as excellent food. More information at <https://www.visittrentino.info/en>