



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 38th cycle

Research Area n. 4 - Telecommunications

**PARTENARIATO PNRR Research Field: HIGH-CAPACITY SUSTAINABLE OPTICAL
COMMUNICATION SYSTEMS FOR SMART NETWORKS**

Monthly net income of PhDscholarship (max 36 months)

€ 1250.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity

**Motivation and objectives of the research
in this field**

This research project is in the framework of
RESTART
PARTENARIATO ESTESO RESEARCH AND
INNOVATION ON FUTURE TELECOMUNICATION
SYSTEMS AND NETWORKS TO MAKE ITALY MORE
SMART
CUP D43C22003080001
Decreto di Concessione D.D. 1549 del 11/10/2022

Owing to the expected strong increase in traffic and performance (energy efficiency and quality of service), the future optical communication networks will require to exploit new transmission solutions based on low-cost and energy-efficient devices. The research aims at the development of innovative optical communication systems able to increase the transmitted capacity in a sustainable way, also providing advanced features such as sensing capabilities, to monitor the environment and the fiber infrastructure itself with high resolution and dynamics.

**Methods and techniques that will be
developed and used to carry out the
research**

Innovative photonic solutions exploiting new transmission formats (for example multi-carrier ones such as DMT) combined with the use of sustainable devices (such as VCSELs with direct modulation) and challenging



	<p>multiplexing techniques (such as space division multiplexing in special fibers) will be considered to increase the overall transported capacity in a sustainable way. With regard to the monitoring features, a systematic and extensive analysis of the performance achievable by the various sensing fiber systems will be achieved, evaluating the quality, reliability and convenience of the different adopted implementation solutions also in suitable installed fiber field-trials.</p>
Educational objectives	<p>The student will develop knowledge and skills for understanding and organizing research in a systematic way, for dealing with new topics and problems, for managing technological constraints to be faced when designing innovative solutions, for challenging with difficult issues, gaining important experiences precious for his/her future job.</p>
Job opportunities	<p>Nowadays, the high-capacity optical network, also with sensing capabilities, represents an extremely interesting field for research and development, with significant job opportunities in telecommunications operators, systems and equipment vendors and TLC SMEs, both in Italy and also at the international level.</p>
Composition of the research group	<p>0 Full Professors 2 Associated Professors 2 Assistant Professors 1 PhD Students</p>
Name of the research directors	<p>Pierpaolo Boffi</p>

Contacts	
<i>pierpaolo.boffi@polimi.it</i>	

Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	625.0 €
By number of months	6



Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

The funding for the scholarship comes from the project RESTART: projects RIGOLETTO and SENSING NET (SPOKE 1 CNR)

EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student

5.095,96 Euro

TEACHING ASSISTANTSHIP: (availability of funding in recognition of supporting teaching activities by the PhD student)

There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

COMPUTER AVAILABILITY: individual use

DESK AVAILABILITY: individual use

D.D. 341 del 15/03/2022 Avviso pubblico per la presentazione di Proposte di intervento per la creazione di "Partenariati estesi alle università, ai centri di ricerca, alle aziende per il finanziamento di progetti di ricerca di base" - nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 "Istruzione e ricerca" - Componente 2 "Dalla ricerca all'impresa" - Investimento 1.3, finanziato dall'Unione europea - NextGenerationEU