



D5.2-I: Yearly Report on Dissemination and Public Engagement

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Executive summary

This deliverable presents the dissemination and public engagement activities carried out during the first two years of the project. The first year has been mainly devoted to the selection of the four early-stage researchers (ESRs). The open positions have been highly advertised and the project has been presented at international conferences as well as during public talks given by the partners.

The ESRs started their PhD program in May 2016 (ESR1) and October 2016 (ESR2, ESR3, ESR4), respectively. Their activity has been mainly focused on defining the state of the art and the research plan. Presentations at the university sites have been given in order to discuss the relevance of the proposed topics and to raise awareness on the project and expected outcome.

The deliverable further presents a plan for dissemination activities during the following years of the project. More publications and talks are planned in order to disseminate the first results and outcomes of the ESRs' research activity.

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1 Introduction

As defined in the GA, the objective of Work Package 5 “Exploitation, Dissemination & Public Engagement” is to organise and monitor communication, dissemination, and result exploitation actions. The target groups are the scientific community, industry and the general public. As this deliverable has been prepared at the end of the second year, it includes activities carried out in the first two years of the project.

The deliverable is structured as follows. Section 2 reports the dissemination activities conducted during the first two years. Namely, it details the presentations given in international conferences as well as at the university sites, collaborations and other dissemination activities. Furthermore, dissemination activities for the upcoming years are presented. Section 3 concludes the deliverable.

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2 Dissemination and Public Engagement Activities

This section includes a description of the dissemination activities performed in the first two years of the project. It is noteworthy to mention that during the first half of the project year the dissemination activities were mainly focused on advertising the four ESR positions. Afterwards, the four ESRs started their research activity, which was mainly focused on analysing the state of the art and detailing the individual research proposal.

A **file-sharing platform** (SharePoint) has been set up to collect all the material related to dissemination activities (e.g. slides, publications etc.), as well as management documents.

2.1 Recruitment Process

Dissemination activities concerning the advertising of the open positions have been detailed in the deliverable D4.2 on “Project Management/Financial Plans, Risks, and Recruitment Report”.

2.2 Journal Publications

During the first year of the project the following research papers were published in highly-ranked scientific journals such as *Optics Express*, published by The Optical Society of America (OSA), and *Scientific Reports*, published by Nature Publishing Group (NPG):

- **Boris Karanov**, Tianhua Xu, Nikita A. Shevchenko, Domaniç Lavery, Robert I. Killey, and Polina Bayvel, “Span Length and Information Rate Optimisation in Optical Transmission Systems Using Single-channel Digital Backpropagation,” *Opt. Express*, vol. **25**(21), pp. 25353-25362, 2017.
- Tianhua Xu, **Boris Karanov**, Nikita A. Shevchenko, Domaniç Lavery, Gabriele Liga, Robert I. Killey, and Polina Bayvel, “Digital nonlinearity compensation in high-capacity optical communication systems considering signal spectral broadening effect,” *Sci Rep.* **7**(1), p. 12986, 2017.

The following work was submitted to the prestigious OSA/IEEE Journal of Lightwave Technology and is currently undergoing peer review process:

- **Andreas Buchberger**, Alexandre Graell i Amat, Vahid Aref, and Laurent Schmalen, “Probabilistic Eigenvalue Shaping for Nonlinear Fourier Transform Transmission,” submitted to *IEEE/OSA J. Lightwave Technol.*

2.3 Main events

- The **European School of Information Theory (ESIT)** was held at CUT in April 2016 with approximately 100 participants. Frank Kschischang, who is the leader of the COIN partner group at the University of Toronto, contributed a half-day tutorial about optical communications in the nonlinear regime. The tutorial was recorded for later use by the COIN ESRs.
- A **workshop on Information Theory of Optical Fiber (MIO)** was organised in December 2016 in Munich, mainly to provide an update on the work on spectral broadening effects and future plans for completion and publication of the work.

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- Most members of the consortium participated in the **ECOC 2017 conference** in Gothenburg (in September 2017). The Professors and Bell Labs supervisors met and discussed the progress of the ESRs, and brainstorming sessions were held to evaluate the research ideas and objectives of the ESRs.

2.4 Conference Proceedings and Presentations

During this initial period of the programme, the following work was presented and published in the proceedings as an invited paper at one of the largest annual conferences in the optical communications community – Optical Fiber Communications Conference (OFC), 2017:

- **Xianhe Yangzhang**, Mansoor I. Yousefi, Alex Alvarado, Domanic Lavery, and Polina Bayvel, “Nonlinear Frequency-Division Multiplexing in the Focusing Regime,” In *Proceeding of Optical Fiber Communications Conference (OFC)*, paper Tu3D.1. (Invited)

The following work has been accepted for presentation and will be published in the paper proceedings at the next Optical Fiber Communications Conference (OFC) in March 2018:

- **Boris Karanov**, Tianhua Xu, Nikita A. Shevchenko, Domanic Lavery, Gabriele Liga, Robert I. Killey, and Polina Bayvel, “Digital Nonlinearity Compensation Considering Signal Spectral Broadening Effects in Dispersion-managed Systems,” In *Proceeding of Optical Fiber Communications Conference (OFC)*, accepted for presentation.

The work of the COIN ESRs also led to three additional conference publications where they served as co-authors, the first one published in the prestigious post-deadline proceedings at the OFC 2017 conference, the second one presented and published in the proceedings of the European Conference on Optical Communication (ECOC), the most prestigious European conference in the field, and the third being invited on the Advances in Wireless and Optical Communications (RTUWO) conference:

- Z. Liu, L. Galdino, J.R. Hayes, D. Lavery, **B. Karanov**, D.J. Elson, K. Shi, B.C. Thomsen, M.N. Petrovich, D.J. Richardson, F. Poletti, R. Slavík, and P. Bayvel, “Record High Capacity (6.8 Tbit/s) WDM Coherent Transmission in Hollow-Core Antiresonant Fiber,” In *Proceeding of Optical Fiber Communications Conference (OFC)*, paper Th5B.8. (Post-deadline)
- Tianhua Xu, Nikita A. Shevchenko, **Boris Karanov**, Domanic Lavery, Lidia Galdino, Alex Alvarado, Robert I. Killey, Polina Bayvel, “Nonlinearity Compensation and Information Rates in Fully-Loaded C-band Optical Fibre Transmission Systems,” in *Proceedings of European Conference on Optical Communication (ECOC)*, paper P2.SC6.30.
- Tianhua Xu, Nikita A. Shevchenko, **Boris Karanov**, Gabriele Liga, Domanic Lavery, Robert I. Killey, and Polina Bayvel, “Digital Nonlinearity Compensation in High-Capacity Optical Fibre Communication Systems: Performance and Optimisation,” in *Proceedings of Advances in Wireless and Optical Communications (RTUWO)*, 67-72. (Invited)

The following work was presented as a poster at the International Symposium on Ultrafast Photonic Technologies (ISUPT) organised by University of Southampton and held in Winchester, United Kingdom:

- **Boris Karanov**, Tianhua Xu, Domanic Lavery, and Polina Bayvel, “Spectral Broadening in High-speed Optical Communication Systems and Impact on the Transmission Capacity,” presented at ISUPT 2017.

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2.5 Presentations at University Sites

During the first year, the following presentations have been given at the university sites:

- Erik Agrell, Oct. 7, 2016 at Communication Systems, Chalmers: Information-theory-friendly models for fiber-optic channels: A primer
- Frank R. Kschischang, Dec. 13, 2016: Digital communication over optical fibers. This 3-hour tutorial was showed by video simultaneously at the three partner sites (Chalmers, UCL, and Bell Labs), followed by a joint online discussion.
- **Andreas Buchberger**, Jan. 13, 2017 at S2-FORCE, Chalmers: Research update and open problems
- **Andreas Buchberger**, May 4, 2017 at Bell Labs: Bit-interleaved coded modulation for amplitude-modulated solitons
- **Morteza Tavana**, May 5, 2017 at E2-FORCE, Chalmers: Research update and open problems
- **Boris Karanov**, July 21, 2017 at UCL EEE Barlow Memorial Lecture and Research Poster Presentation, UCL: Research update and open problems
- **Xianhe Yangzhang**, July 21, 2017 at UCL EEE Barlow Memorial Lecture and Research Poster Presentation, UCL: Research update and open problems.

2.6 Presentations at Industry Sites

During the first year, while carrying out their secondments, the following presentation has been given by ESRs at the Nokia Bell Labs site in internal events given to decision makers and stakeholders in research:

- **Andreas Buchberger**, “Bit-Interleaved Coded Modulation for Multi-Soliton Communications and Probabilistic Eigenvalue Shaping for Nonlinear Fourier Transform Transmission”

2.7 Collaborations

The COIN consortium actively seeks collaborations for generating stronger research impacts as well as the international visibility and dissemination of the project.

Since autumn 2016, the consortium has been in the process of establishing a collaboration with the Institute for TU Eindhoven (TU/e). TU/e is launching research activities in nonlinear fiber channel modelling and communication. This initiative is well in line with the research themes of COIN. At present, the COIN consortium and TU/e are in the phase of exploring activities of mutual interest, such as visits of senior staff, exchange of ESRs, and joint organization of workshop and conference sessions.

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2.8 Website

A dedicated website is available since January 2016. The website link is <http://coinproject.eu>. The public section of the website has been updated in order to include:

- A comprehensive description of the project and its objectives;
- A description for each one of the hired Early Stage Researchers (ESRs), including a short bio and abstract of their current activities in order to raise visibility;
- Access to the project's public deliverables;
- Access to all published/accepted for publication research within the project framework;
- Updated "News & Events" session.

2.9 Social networking

Social networking services such as LinkedIn, Research Gate, Facebook and Twitter are utilised as cost-efficient ways of continuous outreach, complementing "traditional" activities.



3 Future Steps

3.1 Technical Papers

The number of contributions and presentations reported in the first year of the project has been limited mainly due to the fact that the four ESRs started their research activities only in May 2016 and October 2016, respectively. In this respect, it is reasonable to postpone of 6 months the expected number of publications reported in the deliverable D5.1 on “Dissemination and public engagement activities plan”.

Namely the updated Table on “Expected number of annual publications” for the first and second year is as follows:

Table 1: Expected number of annual publications

First PhD year (2016-2017)	4
Second PhD year (2017-2018)	8

3.2 Main Events

Different events are planned to be organised in the upcoming years:

- A consortium symposium will be organised (it will be virtual to limit travel costs) in 2018. During the consortium symposium, the ESRs will give the first of the three expected **seminars**. The seminar will outline their understanding of the state of the art and a draft of their research proposal.
- **Talks** in international as well as local events are planned for the next years in order to further raise awareness on the project activities and disseminate the first results achieved.
- Consortium partners will present the outcome of the COIN research in international leading peer-reviewed conferences/workshops (such as OFC, ECOC, SPPCOM, MiO, ISIT, etc.)

3.3 Media releases

Articles in newspapers and press releases will be targeted, discussing the key innovative ideas of the COIN project and its contribution to ICT development. These releases will highlight the different benefits for the general public and how the MSCA funding scheme fosters the Industrial-focused Doctoral studies. In addition, opportunities of TV or radio interviews will be pursued to bring, at a high level, the knowledge, achievement, and importance of the scientific domain of COIN, as well as the impact of the MSCA for the European Research Area.

3.4 Other activities

Other activities will be carried out in the upcoming years, namely:

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- **Alignment with other EU and international projects**

Alignment with other EU and international projects (such as ICONE, SENDATE, UNLOC, FONTE, and ONFIRE) will be ensured in order to exploit the results produced in the field.

For instance, UNLOC is currently investigating topics closely related to the ones addressed by the project. The collaboration will increase the visibility of the results obtained in the project. Similarly, FONTE will investigate similar nonlinear communication techniques as COIN and hence, the collaboration will both increase the visibility of the project and foster new results. The ONFIRE project targets new optical networking architectures. A collaboration with ONFIRE will allow to leverage the results obtained in COIN in a more architectural scenario.

- **Participation in program committees and editorial boards** (e.g., special sessions in top-tier IEEE/ACM conferences and/or workshops, and special issues of IEEE/Elsevier/Springer and open journals);

- **Participation in forums and industrial oriented events**

In order to promote the produced research results to the broader industrial sector, COIN will aim to participate at industrial events, at which companies working in the optical, wireless and wireline communications domain will be invited to become introduced to the project activities and trainees.

- **Organisation of engagement activities**

Fellows of the COIN consortium will engage with the general public and younger citizens to communicate on the key research outcomes, giving popularised presentations in schools, universities and in civic/municipal venues (e.g., libraries). The goal is to inform citizens about H2020, the MSCA actions, and the COIN research on beyond the state of the art optical networks, illustrating benefits and demonstrating how this research can affect people.

- **Webcasts**

To widen the audience, some of the talks given in the organised events above will be recorded and made available online at the project web site as webcasts. Thus anyone being not able to attend the events will have the opportunity to watch the talks and be informed of the activities and the MSCA in general."

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4 Quality Assessment and Conclusions

This deliverable has documented dissemination activities (WP5) undertaken during the first two years of COIN. Furthermore, a plan for the following years has been detailed. The first half of the first year has been mainly devoted to the recruitments of the ESRs – activity that has been detailed in the deliverable D4.2 on “Project Management/Financial Plans, Risks, and Recruitment Report”. More publications and presentations in international events are planned for the following years of the project, once the ESRs have concluded the state-of-the-art review and defined their research plan.

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