QCIT Meeting - 30th of November 2021

Organized
by
Andrea Conti, Lajos Hanzo, Soon-Xin Ng and Peter Mueller

Agenda

- Welcome and Opening
- Invitation to IEEE Quantum Week 2022 by General Chair Prof. Greg Byrd
- Tutorial Presentation by Prof. Pascal Vontobel, The Chinese University of Hong Kong (Scroll down for Abstract and Bio)
- Approval of the Minutes of the QCIT Meeting at ICC'2021
- Next QCIT-ETC Meeting & Workshop: ICC'2022
- Adjourn

Zoom Link for joining:
https://zoom.us/j/98201985601

SPEAKER:

Pascal O. Vontobel Department of Information Engineering The Chinese University of Hong Kong

TITLE:

Tutorial on a graphical-model-based approach to quantum information processing

ABSTRACT:

The aim of this presentation is to give an introduction to a post-graduate course on quantum information processing (QIP) that we taught earlier this year and whose course materials (lecture slides, homework assignments, and lecture videos) are available here:
https://sites.google.com/site/pascalvontobel/qip_course

A special feature of this QIP course is that it uses, as far as possible, graphical models. This allows for a unified and more accessible treatment of various topics, along with highlighting the differences between classical and quantum information processing. (The graphical models that are used are very similar to tensor networks. However, one advantage of the graphical models that are used is that they are compatible with graphical models used in classical information processing.) This QIP course is designed to be accessible to a broad audience. Therefore, we only require a solid understanding of linear algebra, classical probability theory, and complex numbers. Relevant background from quantum physics, graphical models, information theory, etc., are introduced as necessary to make this course as self-contained as possible.

In the first part of this presentation, we will discuss some of the "highlights" of this QIP course; in the second part, we will discuss some of the underlying technical details.

BIOGRAPHY:

Pascal O. Vontobel received the Diploma degree in electrical engineering in 1997, the Post-Diploma degree in information techniques in 2002, and the Ph.D. degree in electrical engineering in 2003, all from ETH Zurich, Switzerland.

From 1997 to 2002 he was a research and teaching assistant at the Signal and Information Processing Laboratory at ETH Zurich, from 2006 to 2013 he was a research scientist with the Information Theory Research Group at Hewlett-Packard Laboratories in Palo Alto, CA, USA, and since 2014 he has been an Associate Professor at the Department of Information Engineering at the Chinese University of Hong Kong. Besides this, he was a postdoctoral research associate at the University of Illinois at Urbana-Champaign (2002-2004), a visiting assistant professor at the University of Wisconsin-Madison (2004-2005), a postdoctoral research associate at the Massachusetts Institute of Technology (2006), and a visiting scholar at Stanford University (2014). His research interests lie in information and coding theory, quantum information processing, data science, communications, and signal processing.

Dr. Vontobel was an Associate Editor for the IEEE Transactions on Information Theory (2009-2012), an Awards Committee Member of the IEEE Information Theory Society (2013-2014), a Distinguished Lecturer of the IEEE Information Theory Society (2014-2015), and an Associate Editor for the IEEE Transactions on Communications (2014-2017). Moreover, he was a TPC co-chair of the 2016 IEEE International Symposium on Information Theory, the 2018 IEICE International Symposium on Information Theory and its Applications, and the 2018 IEEE Information Theory Workshop, along with being the director of the 2021 Croucher Summer Course in Information Theory, co-organizing several topical workshops, and being on the technical program committees of many international conferences. Furthermore, he was multiple times a plenary speaker at international information and coding theory conferences, he received an exemplary reviewer award from the IEEE Communications Society, and was awarded the ETH medal for his Ph.D. dissertation. He is an IEEE Fellow.