

UBISS 2023

11TH INTERNATIONAL UBI SUMMER SCHOOL

JUNE 12-17, 2023

OULU, FINLAND



[UBICOMP.OULU.FI/UBISS2023](https://ubicomp.oulu.fi/ubiss2023)



PROGRAM AT A GLANCE

Monday June 12	8:30	Registration and UBI Café Open Location: University of Oulu, Linnanmaa, Erkki Koiso-kanttilan katu 3, door E
	9:00-12:00	INTERNATIONAL UBICOMP SEMINAR 2023 Location: University of Oulu, Linnanmaa campus, L10
	12:00-13:00	Lunch in TS101
	13:15-14:15	Campus Tour 5G Test Network, EEG Lab, Perception Engineering Lab
	14:30-15:45	Summer School Kick Off Location: University of Oulu, Linnanmaa campus, TS101
	16:00-18:00	Workshops Kick Off Location: University of Oulu, Linnanmaa campus, workshops' forts
	18:30-22:00	Get Together Party Location: Science Garden, Kaitoväylä 5 After party bus to Nallikari and downtown
Tuesday June 13	10:00-18:00	Hard work in the workshops
Wednesday June 14	10:00-18:00	Hard work in the workshops
	19:00-22:00	Dinner Boat Cruise aboard M/S Casandra Location: Market Place Pier Bus to pier departs from summer school site at 18:15 (via Nallikari) At 22:00 and 24:00 bus from market place to Nallikari and Linnanmaa campus
Thursday June 15	10:00-18:00	Hard work in the workshops
Friday June 16	10:00-18:00	Hard work in the workshops
Saturday June 17	9:00-12:00	Final Exam Location: University of Oulu, Linnanmaa campus, L10
	12:00-13:00	Lunch in Restaurant Kastari
	13:15-17:15	Result Seminar Location: University of Oulu, Linnanmaa campus, L2
	17:20-17:50	Debriefing in Workshops Location: University of Oulu, Linnanmaa campus, workshops' forts Bus to Nallikari departs from summer school site at 18:00
	20:00	School Dinner Location: Johteenpooki, Kansankentäntie 11 Bus to Johteenpooki departs from Linnanmaa at 19:30 and from Nallikari at 19:45

INTERNATIONAL UBI COMP SEMINAR 2023

Date	Monday, June 12, 2023
Time	9:00 – 12:00
Location	University of Oulu, Linnanmaa campus, lecture hall L10
Web	http://ubicomp oulu.fi/international-ubicomp-seminar-2023/
Program	
9:00	Opening words
9:10	CREATING VIRTUAL REALITY EXPERIENCES FOR SOCIAL GOOD Prof. Victoria Interrante, University of Minnesota, USA
9:35	SMART INTERNET OF THINGS (IOT) WIRELESS CONNECTIVITY IN 5G AND BEYOND Assistant Prof. Israel Leyva-Mayorga, Aalborg University, Denmark
10:00	THE MIND ELECTRIFIED: EEG/ERP IN THE LAB AND IN THE WILD Prof. Kara D. Federmeier, University of Illinois Urbana-Champaign, USA
10:25	Coffee break
10:40	UBICOMP RESEARCH REPORT Prof. Timo Ojala, University of Oulu, Center for Ubiquitous Computing (UBICOMP)
11:05	Q&A WITH THE SPEAKERS
11:50	Closing words



Q&A with the speakers ongoing in the International UBI COMP Seminar 2010.

Panelists from left: Anind Dey (Carnegie Mellon University, USA), Marcus Foth (Queensland University of Technology, Australia), Zach Shelby (Sensinode, Finland), Jürgen Scheible (Aalto University, Finland), Vassilis Kostakos (University of Madeira, Portugal), Adam Greenfield (Urbanscale, USA), Mikael Wiberg (Uppsala University, Sweden). Moderator: Timo Ojala (University of Oulu, Finland).

UBISS CONCEPT

The purpose of the annual international UBI Summer Schools (UBISS) is to provide researchers, students, and industry and public sector professionals with an opportunity to gain hands on experience and insight on selected topics under the tutelage of distinguished experts. UBISS typically comprises of 3-6 parallel 6-day “hands on” workshops where the instructor(s) first provide a theoretical framing of the topic of the workshop and then supervise students’ group projects whose outcome is presented in the result seminar in the last day. Thus, the instructor(s) work intimately with their students throughout the week, in contrast to many other summer/winter schools, where a particular instructor is available only for a limited amount of time in form of lectures or a tutorial. To stimulate interaction between attendees, UBISS has a rich social program in form of get together party, dinner boat cruise and school dinner.

Students are selected through an open international call so that all prospective students submit an online application where they identify their preferred workshop(s) and justify why they should be accepted to a particular workshop. The instructor(s) select from the pool of applications students who then confirm their seat through registration. The instructor(s) prep their students with a reading package studied in advance and pre summer school assignments. Students completing their project and passing the written exam given in the last day of the summer school will be awarded 5 ECTS credits towards their studies, subject to the approval by a student’s home institution. The design and implementation of future UBISS is informed by the feedback that students provide in a comprehensive post summer school questionnaire.

The first UBISS was organized in summer 2010, to provide the prospective participants of the 1st International UBI Challenge 2011 with an opportunity to gain hands-on experience on the urban computing infrastructure in Oulu that was utilized in the UBI Challenge. Prof. Albrecht Schmidt (back then in University of Stuttgart, now in LMU Munich) proposed arranging a summer school for this purpose. The first UBISS enrolled 72 participants from 20 countries in six parallel workshops. The excellent feedback from both instructors and students participating in the inaugural and subsequent summer schools has convinced us to host UBISS as an annual tradition, with a highly multidisciplinary collection of workshops over the years. So far, over 500 students from all over the world have attended an UBISS, many of them multiple times. Dr. Eduardo Velloso became the first former UBISS student to return as a ‘junior’ co-instructor to Prof. Hans Gellersen in UBISS 2016, incarnating the endless cycle of academics passing on their knowledge to later generations. Further two former UBISS students, Dr. Denzil Ferreira and Dr. Simo Hosio, returned as ‘junior’ co-instructors in UBISS 2018.



UBISS 2019 enrolled 83 students from 10 countries in four parallel workshops

WORKSHOPS

A

CREATING VIRTUAL REALITY EXPERIENCES FOR SOCIAL GOOD



Prof. Victoria Interrante
University of Minnesota
USA

Dr. Matti Pouke
University of Oulu
Finland



Dr. Paula Alavesä
University of Oulu
Finland



B

SMART INTERNET OF THINGS (IOT) WIRELESS CONNECTIVITY IN 5G AND BEYOND



Prof. Petar Popovski
Aalborg University
Denmark

Dr. Shashi Raj Pandey
Aalborg University
Denmark



Assistant Prof. Israel Leyva-Mayorga
Aalborg University
Denmark

C

THE MIND ELECTRIFIED: EEG/ERP IN THE LAB AND IN THE WILD



Prof. Kara D. Federmeier
UIUC
USA

Dr. Evan G. Center
University of Oulu
Finland



Dr. Ryan J. Hubbard
UIUC
USA

Dr. Melissa Troyer
UIUC
USA



WORKSHOP A

CREATING VIRTUAL REALITY EXPERIENCES FOR SOCIAL GOOD

Instructors: Prof. Victoria Interrante, University of Minnesota, USA
 Dr. Matti Pouke, University of Oulu
 Dr. Paula Alaves, University of Oulu

Liaison student: Eetu Laukka, University of Oulu, eetu.laukka@oulu.fi

Forts: TS133, TS134, TS135

SCHEDULE

DATE	TIME	TOPIC	LOCATION
Monday June 10	9:00-12:00	International UBICOMP Seminar 2023	L10
	12:00-13:00	Lunch	TS101
	13:15-14:15	Campus Tour	UBI Café
	14:30-15:45	Summer School Kick Off	TS101
	16:00-18:00	Lecture: Introduction to Using VR for Social Good	TS133
	18:30-22:00	Get Together Party	Science Garden
Tuesday June 11	10:00-12:00	Lecture: VR Hardware	TS133
	12:00-13:00	Lunch	Kastari
	13:00-15:00	Lecture: Virtual Environment Creation	TS133
	15:00-15:30	Coffee	UBI Café
	15:30-18:00	Project: Introduction to Unreal Engine Development	TS135
	18:45	Dinner with "Extending Reality? Immersive Technologies in Transdisciplinary Science" workshop	Den Gamlas Hem
Wednesday June 12	10:00-12:00	Lecture: Digital Characters (applications)	TS133
	12:00-13:00	Lunch	Kastari
	13:00-15:00	Lecture: Digital Characters (implementation)	TS133
	15:00-15:30	Coffee	UBI Café
	15:30-18:00	Project: Independent work	TS134 & TS135
	19:00-22:00	Dinner Boat Cruise	Market place
Thursday June 13	10:00-12:00	Lecture: Cybersickness, Presence, and Locomotion	TS133
	12:00-13:00	Lunch	Kastari
	13:00-15:00	Project: Independent work	TS134 & TS135
	15:00-15:30	Coffee	UBI Café
	15:30-18:00	Project: Independent work	TS134 & TS135
Friday June 14	10:00-12:00	Project: Independent work + project check-in	TS134 & TS135
	12:00-13:00	Lunch	Kastari
	13:00-15:00	Project: Independent work	TS134 & TS135
	15:00-15:30	Coffee	UBI Café
	15:30-18:00	Project: Independent work	TS134 & TS135
Saturday June 15	9:00-12:00	Final Exam	L10
	12:00-13:00	Lunch	Kastari
	13:15-17:15	Result Seminar	L2
	17:20-17:50	Debriefing	TS133
	20:00	School Dinner	Johteenpooki

INSTRUCTORS



Victoria Interrante is a Full Professor in the Department of Computer Science and Engineering at the University of Minnesota and Director of the University-wide Center for Cognitive Sciences. Professor Interrante has a 20-year history of involvement in VR research, focusing primarily on efforts related to the application of insights from visual perception and cognition. She is currently serving on the steering committee of the international IEEE VR conference and as co-editor-in-chief of the ACM Transactions on Applied Perception. She is the recipient of the IEEE VGTC Career Award in 2020.



Matti Pouke is a postdoctoral researcher in the Perception Engineering (PE) research group at the Center for Ubiquitous Computing, University of Oulu, Finland. In his doctoral research he studied the transformation and visualization of real human activity in virtual environments. Since then he has been involved in many research and development projects involving the use of virtual environments in public urban contexts, including smart buildings, architectural visualizations, and libraries. His current research focuses on human perception in multi-scale virtual reality experiences as well as Presence and Plausibility. He is a member of ACM and IEEE.



Paula Alavesä is a postdoctoral researcher in the Perception Engineering (PE) research and Cyber Security and Informatics (CSI) groups at the Center for Ubiquitous Computing, University of Oulu, Finland. Her doctoral thesis (2018) focused on playful appropriations of hybrid spaces where virtual and physical environments were combined into urban pervasive games. She has several years of experience in applied constructive research with location-based, augmented, and virtual reality technologies. Her current research continues the overarching theme of combining digital and physical realms using XR technologies and games or gamification approach as the mediator. She is a member of IEEE, ACM, SIGCHI and Digital Games Research Association (DiGRA).

SYNOPSIS

As it matures, virtual, augmented, and mixed reality technology (VR) has increasing potential to enable fundamental and transformative advances in a broad range of societally beneficial areas. Sometimes called “the ultimate empathy machine” for its ability to enable compelling first-person experiences, VR is already being actively used many fields, such as: journalism (to bring stories to life), museums (to promote active engagement with cultural and historical content), medicine (e.g. surgical planning, pain management, physical rehabilitation, and more), psychotherapy, architectural and interior design, K-12 education, job training (including implicit bias mitigation), and much more. The global virtual reality market was valued at US \$3.13 billion in 2019, primarily driven by the video game industry, but continued rapid growth is expected as the market diversifies. Nonetheless, VR is still an emerging medium, and the creation of compelling and useful applications requires knowledge and skills that are fundamentally different from traditional computing.

This workshop will provide an overview of the theoretical foundations, hardware/software technologies, and interaction techniques necessary to begin creating optimally effective virtual reality experiences. Structured as a mixture of theory and practice, the workshop will also provide students with the opportunity to gain practical experience by implementing 3D user interfaces and developing a prototype VR application motivated by a social good problem.

Major learning objectives include:

- Understanding virtual reality technologies, including displays, motion tracking, and input devices, and software frameworks such as the Unreal game engine,

UBISS 2023 - 11TH INTERNATIONAL UBI SUMMER SCHOOL

- Gaining familiarity with both current and future applications of virtual reality, especially those that address societal challenges and contribute to social good,
- Learning about the design and implementation of 3D interaction techniques, including navigation, selection, manipulation, and system control,
- Thinking critically about what makes a virtual reality experience effective and compelling (and conversely, what doesn't),
- Gaining practical experience in developing a virtual reality application that applies 3D user interface best practices.

In this workshop, we will be using the Unreal game engine, blueprints and C++. Prior experience with these specific tools is not expected. However, students should have solid programming skills in at least one modern programming language (e.g., Java, C++, Python, etc.) and be comfortable with consulting documentation to look up unfamiliar syntax. Basic knowledge of computer graphics is also beneficial, but not required.

STUDENTS

First name	Last name	Organization	Country
Mathioli	Anbarasu	Indian Institute of Technology Madras	India
Van Phuc	Bui	Aalborg University	Denmark
Andreas	Casparsen	Aalborg University	Denmark
Khalil Mohamed	Chakal	University of Oulu	Finland
Alexis	Chambers	University of Oulu	Finland
Layla	Farmahini Farahani	Wageningen University & Research	Netherlands
Filip	Georgiev	University of Oulu	Finland
Mikki	Hiltunen	University of Oulu	Finland
Mohammadamin	Hosseinfard	University of Oulu	Finland
Bastian Ilsø	Hougaard	Aalborg University	Denmark
Juho	Kalliokoski	University of Oulu	Finland
Ummi	Latif	University of Oulu	Finland
Eetu	Laukka	University of Oulu	Finland
Andreea	Muresan	University of Copenhagen	Denmark
Nazanin	Nakhaie Ahoovie	University of Oulu	Finland
Siiri	Paananen	University of Lapland	Finland
Joni	Rajala	University of Oulu	Finland
Shafa	Sabeti Motlagh	University of Oulu	Finland
Sai Naveena Sri	Saravana Sundaram	Indian Institute of Technology Madras	India
Priyanka	Sebastian	University of Oulu	Finland
Sohail Ahmed	Soomro	University of Oulu	Finland
Mridula	Thazhathu Veettil	Indian Institute of Technology Madras	India
Elmeri	Uotila	University of Oulu	Finland
Krystof	Zeman	Brno University of Technology	Czech Republic

WORKSHOP B

SMART INTERNET OF THINGS (IOT)

WIRELESS CONNECTIVITY IN 5G AND BEYOND

Instructors: Professor Petar Popovski, Aalborg University, Denmark
 Assistant Professor Israel Leyva-Mayorga, Aalborg University, Denmark
 Dr. Shashi Raj Pandey, Aalborg University, Denmark

Teaching assistant: Assistant Professor Konstantin Mikhaylov, University of Oulu, Finland

Liaison student: Mehrdad Kaheh, University of Oulu, Finland, mehrdad.kaheh@oulu.fi

Fort: TS128

SCHEDULE

DATE	TIME	TOPIC	LOCATION
Monday June 12	9:00-12:00	International UBICOMP Seminar 2023	L10
	12:00-13:00	Lunch	TS101
	13:15-14:15	Campus Tour	UBI Café
	14:30-15:45	Summer School Kick Off	TS101
	16:00-17:00	Lecture: Introduction to IoT, use cases, and requirements	TS128
	17:00-18:00	Project: Introduction	TS128
	18:30-22:00	Get Together Party	Science Garden
Tuesday June 13	10:00-12:00	Lecture: Wireless access mechanisms for the IoT	TS128
	12:00-13:00	Lecture: Massive IoT	TS128
	13:00-14:00	Lunch	UBI Café
	14:00-15:00	Lecture: NB-IoT standardization and protocols	TS128
	15:00-18:00	Project: Platform and sensor data	TS128
Wednesday June 14	10:00-12:00	Lecture: Energy consumption models and edge computing	TS128
	12:00-13:00	Lecture: Satellite access for the IoT	TS128
	13:00-14:00	Lunch	Kastari
	14:00-16:00	Project: NB-IoT connectivity	TS128
	16:00-18:00	Project: Statistical analysis of the data	TS128
	19:00-22:00	Dinner Boat Cruise	Market place
Thursday June 15	10:00-11:30	Lecture: Semantic and goal-oriented communications	TS128
	11:30-13:00	Lecture: Basics of machine learning	TS128
	13:00-14:00	Lunch	Kastari
	14:00-16:00	Project: Machine learning algorithms and implementation	TS128
	16:00-18:00	Project: Intelligent data transmission	TS128
Friday June 16	10:00-12:00	Lecture: Data valuation, data markets, and blockchain	TS128
	12:00-13:00	Lecture: IoT in 6G	TS128
	13:00-14:00	Lunch	Kastari
	14:00-18:00	Project: Implementation of the final solution	TS128
Saturday June 17	9:00-12:00	Final Exam	L10
	12:00-13:00	Lunch	Kastari
	13:15-17:15	Result Seminar	L2
	17:20-17:50	Debriefing	TS128
	20:00	School Dinner	Johteenpooki

INSTRUCTORS



Petar Popovski is a Professor at Aalborg University, where he heads the section on Connectivity and a Visiting Excellence Chair at the University of Bremen. He received his Dipl.-Ing and M. Sc. degrees in communication engineering from the University of Sts. Cyril and Methodius in Skopje and the Ph.D. degree from Aalborg University in 2005. He is a Fellow of the IEEE. He received an ERC Consolidator Grant (2015), the Danish Elite Researcher award (2016), IEEE Fred W. Ellersick prize (2016), IEEE Stephen O. Rice prize (2018), Technical Achievement Award from the IEEE Technical Committee on Smart Grid Communications (2019), the Danish Telecommunication Prize (2020) and Villum Investigator Grant (2021). He is currently the Editor-in-Chief of IEEE JOURNAL ON SELECTED AREAS IN COMMUNICATIONS. Prof. Popovski was the General Chair for IEEE SmartGridComm 2018 and IEEE Communication Theory Workshop 2019. His research interests are in communication theory and wireless connectivity. He authored the book “Wireless Connectivity: An Intuitive and Fundamental Guide”, published by Wiley in 2020.



Israel Leyva-Mayorga is an Assistant Professor at the Connectivity Section (CNT) of the Department of Electronic Systems, Aalborg University (AAU), Denmark. He received the B.Sc. degree in telematics engineering and the M.Sc. degree (Hons.) in mobile computing systems from the Instituto Politécnico Nacional (IPN), Mexico, in 2012 and 2014, respectively, and the Ph.D. in telecommunications (Cum laude) from the Universitat Politècnica de València (UPV), Spain, in 2018. He was a visiting researcher at the Department of Communications of the UPV in 2014 and at the Deutsche Telekom Chair of Communication Networks, Technische Universität Dresden, Germany, in 2018 and a Postdoctoral Researcher at AAU from January 2019 to July 2021. He has authored more than 40 peer-reviewed research papers in the areas of satellite communications, massive machine-type communications (mMTC), edge computing, and random and multiple access protocols. He serves as Associate Editor for IEEE Wireless Communications Letters, Board Member for one6G association, and representative of AAU in 6G IA SNS.



Shashi Raj Panday is a Postdoctoral Researcher at the Connectivity Section (CNT), Department of Electronic Systems, Aalborg University. He is also an affiliated member at the Pioneer Center for AI, Denmark. He received his B.E. degree in Electrical and Electronics with a specialization in Communication from Kathmandu University, Nepal, and the Ph.D. degree in Computer Science and Engineering from Kyung Hee University, Seoul, South Korea. He served as a Network Engineer at Huawei Technologies Nepal Co. Pvt. Ltd, Nepal from 2013 to 2016. His research interests include network economics, game theory, wireless communications and networking, distributed machine learning and semantic communications. He was a Member at Large at the IEEE Communication Society Young Professionals 2020 — 2021. He currently serves as a Member at Large in the IEEE Communication Society On-Line Content Board and is in the editorial advisory board of IEEE Spectrum’s The Institute 2022 — 2024.

SYNOPSIS

The Internet of Things (IoT) identifies the network of interconnected systems, involving sensors and actuators that communicate and collaborate without human intervention. IoT connectivity has significantly different requirements and traffic characteristics from traditional human-to-machine (H2M) services (download, web browsing, video streaming) and human-to-human (H2H) communication as IoT communication is oftentimes characterized by the intermittent transmission/reception of small data portions. Furthermore, due to the interaction between sensors and actuators, numerous IoT applications present strict latency, reliability, and energy efficiency requirements. Thus, adequate access mechanisms must be developed based on the traffic characteristics of IoT applications to efficiently fulfill their requirements. Recent standardization efforts led to the development of the narrowband Internet of Things (NB-IoT), the low-power wide-area implementation in cellular base stations. NB-IoT has positioned itself as the major player in the IoT sector due to its greater transmission range and longer battery lifetime with respect to other IoT technologies. However, the current IoT technologies only provide a set of generic access mechanisms that are oblivious to the ultimate goal of the communication process and, consequently, to the real timing requirements of the application. This workshop

focuses on the interplay between the data generation process, the access mechanisms, and the content of the data and their relevance for the objective of the application.

In summary, this workshop includes:

- Use cases and performance requirements for IoT applications,
- Theoretical aspects and fundamentals of wireless communications for the IoT,
- Timing metrics for IoT applications,
- Basics of machine learning and data analytics for the IoT,
- 5G and NB-IoT access protocols,
- Non-terrestrial networks for the IoT,
- Joint project discussion and planning,
- Hands-on sessions to program the NB-IoT devices and setup the applications.

The participants will learn:

- The theoretical basis and design principles of wireless communication protocols and IoT architectures,
- How to program and implement an IoT application with real cellular IoT devices,
- How to use data-driven methods to maximize the efficiency of IoT applications.

To get the most out of the workshop, basic knowledge on wireless communications and programming languages is encouraged.

STUDENTS

First name	Last name	Organization	Country
Bilgehan	Akdemir	University of Oulu	Finland
Constantino	Alvarez Casado	University of Oulu	Finland
Muhammad	Asad Ullah	University of Oulu	Finland
Amirhossein	Azarbahram	University of Oulu	Finland
Ashan	Chameera	University of Oulu	Finland
Xavier Alejandro	Flores	University of Oulu	Finland
Amirhossein	Ghaffari	University of Oulu	Finland
Achira	Hendalage	University of Oulu	Finland
Md. Ziaul	Hoque	University of Oulu	Finland
Emad	Ibrahim	Lulea University of Technology	Sweden
Johirul	Islam	University of Oulu	Finland
Mariam	Issa	CNRS - University of Rennes	France
Mehrdad	Kaheh	University of Oulu	Finland
Janani	Khelwala	University of Oulu	Finland
Abdul Basit	Khattak	University of Oulu	Finland
Mehdi	Letafati	University of Oulu	Finland
Gabriel	Martins de Jesus	University of Oulu	Finland
Prasoon	Raghuwanshi	University of Oulu	Finland
Alaa	Saleh	University of Oulu	Finland
Hafiz Faheem	Shahid	University of Oulu	Finland
Martin	Stusek	Brno University of Technology	Czech Republic
Zunera	Umar	Politecnico di Torino	Italy
Rafael	Valente da Silva	University of Oulu	Finland
Isabella	Wanderley Gomes da Silva	University of Oulu	Finland
Nisita	Weerasinghe	University of Oulu	Finland

WORKSHOP C

THE MIND ELECTRIFIED: EEG/ERP IN THE LAB AND IN THE WILD

Instructors: Professor Kara D. Federmeier, UIUC, USA
 Dr. Evan G. Center, University of Oulu, Finland
 Dr. Ryan J. Hubbard, UIUC, USA
 Dr. Melissa Troyer, UIUC, USA

Liaison student: Katherine Mimnaugh, University of Oulu, katherine.mimnaugh@oulu.fi

Forts: TS127 & EEG Lab

SCHEDULE

DATE	TIME	TOPIC	LOCATION
Monday June 12	9:00-12:00	International UBICOMP Seminar 2023	L10
	12:00-13:00	Lunch	TS101
	13:15-14:15	Campus Tour	UBI Café
	14:30-15:45	Summer School Kick Off	TS101
	16:00-16:30	Lecture: Introduction of the workshop	TS127
	16:30-18:00	Lecture: EEG background and physiology	TS127
	18:30-22:00	Get Together Party	Science Garden
Tuesday June 13	10:00-11:30	Lecture: Principles of EEG data collection	TS127
	11:30-13:30	Project: Laboratory experience and lunch	EEG Lab & Kastari
	13:30-14:30	Lecture: EEG data analysis	TS127
	14:30-15:00	Break	UBI Café
	15:00-16:00	Lecture: Experimental design and inferencing from EEG	TS127
	16:00-18:00	Project: Set up work environments on students' computers; try out Muses	TS127
Wednesday June 14	10:00-11:30	Lecture: Oscillations	TS127
	11:30-13:30	Visit to Multimodal Neuroimaging Lab in Oulu University Hospital	
	13:30-15:00	Lecture: The P300	TS127
	15:00-15:30	Break	UBI Café
	15:30-16:30	Project: Data recording with Muse	TS127
	16:30-17:00	Lecture: The P300 in the Wild	TS127
	17:00-18:00	Project: Form project groups, brainstorming	TS127
19:00-22:00	Dinner Boat Cruise	Market place	
Thursday June 15	10:00-12:00	Lecture: ERP toolkit	TS127
	12:00-13:30	Lunch	Kastari
	13:30-15:00	Project: ERP analysis with ERPlab	TS127
	15:00-15:30	Break	UBI Café
	15:30-16:30	Project: Analysis of Muse data	TS127
	16:30-17:00	Project: Discussion of lab data vs. Muse data	TS127
	17:00-18:00	Project: Groups select project ideas	TS127
Friday June 16	10:00-10:45	Project: Groups present project ideas for feedback	TS127
	10:45-12:00	Project: Groups collect data	EEG Lab
	12:00-13:30	Lunch	Kastari
	13:30-15:00	Project: Groups finish data collection and analyze data	TS127
	15:00-15:30	Break	UBI Café
	15:30-18:00	Project: Groups finalize projects and prepare presentation	TS127
Saturday June 17	9:00-12:00	Final Exam	L10
	12:00-13:00	Lunch	Kastari
	13:15-17:15	Result Seminar	L2
	17:20-17:50	Debriefing	TS127
	20:00	School Dinner	Johteenpooki

INSTRUCTORS



Kara D. Federmeier received her Ph.D. in Cognitive Science from the University of California, San Diego. She is a Professor in the Department of Psychology and the Neuroscience Program at the University of Illinois and a full-time faculty member at the Beckman Institute for Advanced Science and Technology, where she co-leads the Illinois Language and Literacy Initiative and heads the Cognition and Brain Lab. She also has served as the President of the Society for Psychophysiological Research. Her research, supported by the National Institute on Aging, examines meaning comprehension and memory across adulthood, using human electrophysiological techniques in combination with behavioral, eyetracking, and other functional imaging and psychophysiological methods.



Evan G. Center received his PhD in cognitive neuroscience from the University of Illinois in 2020, where his thesis focused on the ways in which our expectations and prior experiences can affect our ongoing perception of the world in the moment. His research uses EEG and behavioral techniques in combination with virtual reality (VR) to understand the dynamics of our perceptual experiences. At the University of Oulu, he looks to leverage the power of VR to bring new realism to old paradigms and address ongoing challenges, such as reducing cybersickness and increasing presence in virtual environments.



Ryan J. Hubbard received his PhD in cognitive neuroscience from the University of Illinois in 2017 with Dr. Kara Federmeier. During his graduate training, he worked as a research specialist at the Thomas J. Watson Research Center, IBM Research, where he combined EEG recordings with psychological experiments in a virtual reality (VR) setting. Following completion of his PhD, Ryan worked as a Postdoctoral Research Scientist at the Information and System Sciences Lab at HRL Laboratories, using his EEG analysis and machine learning expertise to examine memory consolidation during sleep. Afterwards, Ryan returned to UIUC as a Beckman Institute Postdoctoral Fellow, and is currently a Postdoctoral Research Associate on an NIA grant examining the impact of aging on language and memory. His research on prediction, language, and memory incorporates advanced electrophysiological

analyses, including time-frequency and multivariate decoding analyses.



Melissa Troyer received her PhD in Cognitive Science from the University of California, San Diego in 2019 and completed a BrainsCAN postdoctoral fellowship at the University of Western Ontario in 2021. She is currently a Beckman Institute Postdoctoral Fellow and member of the Cognition and Brain Lab at the University of Illinois at Urbana-Champaign, where she collaborates with Dr. Kara Federmeier and Dr. Elizabeth Stine-Morrow. Melissa uses electrophysiology and behavior to study how variation in what people know relates to how they anticipate, make sense of, and (potentially) learn from language in real time. She is also interested in how variation in knowledge and natural aging combine to shape these processes during language comprehension, across the lifespan.

SYNOPSIS

Trying to determine what people are perceiving, paying attention to, understanding, remembering, feeling, and planning is a central part of many education, health, business, and industry applications. Yet these are hidden states, and our ability to infer them from overt behaviors and people's self-reports is limited. For several decades now, scientists have used non-invasive laboratory-based recordings of brain electrical activity – the electroencephalogram (EEG) – to study cognitive and emotional processing, yielding a rich understanding of how these processes manifest in brain activity. In particular, Event-Related Potentials (ERPs), EEG signals that are temporally synchronized with the presentation of sensory stimuli and/or behavioral responses, provide functionally specific indices of many, otherwise

hidden, mental processes and states. More recently, technological developments have allowed the measurement of EEG to move out of the laboratory and “into the wild” – to be done in homes, classrooms, performance venues and even outdoors, and to record data while people are moving around and engaged in real world activities. In parallel, analytical approaches have been developed to extract information from the much noisier signals created in these contexts and, more generally, to examine other aspects of the EEG signal, including changes in brain oscillatory patterns. This unleashes exciting new opportunities to monitor, understand, and even augment our own and others’ cognitive and emotional functioning.

In this workshop, you will gain theoretical and practical experience with the use of EEG and ERPs to study cognition, both in a laboratory and real-world context. Lecture material will overview the physiological basis of the signal, technological and design considerations for the use of EEG/ERPs, and measurement and inference-drawing from electrophysiological signals. You will also develop an “ERP toolkit” – strategies for using these measures to assess a wide range of processes critical for perception, attention, memory, language, decision-making, and response planning. Much of the workshop will be hands-on: You will have the opportunity to collect EEG data in a laboratory setting and with a mobile EEG headset, and you will learn how to clean and analyze data and extract ERP and oscillatory measures. By the end of the week, you will be able to develop and present a proposal/pitch for a novel use of EEG to answer a basic science or applied question.

We welcome participants from different areas of expertise, including neuroscience, psychology, and computer science, among others. No previous experience with EEG is required. Analyses will be done using Matlab-based platforms, so you should have prior experience with Matlab or more general experience manipulating large data sets in other programming environments.

STUDENTS

First name	Last name	Organization	Country
Dipdisha	Bose	Indian Institute of Technology Madras	India
Naomi	Heffer	Bath Spa University	United Kingdom
Gibbeum	Kim	University of Illinois Urbana-Champaign	USA
Mikko	Korkiakoski	University of Oulu	Finland
Alexander	LaValle	University of Oulu	Finland
Sunmi	Ma	Laboratory of Brain & Cognitive Sciences for Convergence Medicine	Republic of Korea
Katherine	Mimnaugh	University of Oulu	Finland
Shukhrat	Mirrakhimov	University of Oulu	Finland
Sadegh	Moradi	University of Oulu	Finland
Silvia	Murgia	University of Illinois Urbana-Champaign	USA
Alessandro	Nardi	University of Oulu	Finland
Daniel	Szabo	University of Oulu	Finland
Mengru	Wang	University of Oulu	Finland
Aleksandra	Zienkiewicz	University of Oulu	Finland

SOCIAL PROGRAM GET TOGETHER PARTY

Monday June 12 at 18:30-22

Location: Science Garden, Kaitoväylä 5 (<https://goo.gl/maps/pAhCvvuUhVMd1zFW8>).

Transportation: Walk from summer school site to Science Garden. After party bus to Nallikari and downtown.

Program: Welcoming words, buffet & guided tour of green houses (group splits in half), 30 Second Madness for students, Finnish Summer Olympics (weather allowing).

30 Second Madness: Students present themselves with 1 slide. Memorable Madness Award(s) will be nominated by a distinguished jury and presented at the School Dinner.

Menu: Pizza, sushi, salad, drinks.

Dress code: Casual.



Science Garden



Class 2014 lined up for madness presentations



Boot throwing in the Finnish Summer Olympics



Class 2013 throwing Finnish darts



Class 2015 students chilling and grilling



Class 2019 balancing in mölky

DINNER BOAT CRUISE

Wednesday June 14 at 19-22

Synopsis: 3-hour cruise on M/S Casandra in front of Oulu River estuary.

Departure location: Market place pier (<https://goo.gl/maps/kiB9hmQJFphGZyHf8>).

Transportation: Bus to cruise departs from the summer school site at 18:15. **OBS!** The bus stops at Nallikari Holiday Village for **10 MINUTES** so that you can drop off your stuff – please make sure to be back on the bus in time! After the cruise buses from market place to Nallikari Holiday Village and Linnanmaa campus at 22:00 and 24:00.

Menu: Green salad, grilled salmon / grilled chicken breast / feta salad, chocolate cake, red and white wine, cash bar.

Dress code: Casual.



M/S Casandra



Class 2011 safely back ashore



Class 2012 instructors fishing: Aaron Quigley is taming the “big one”, while Jonna Häkkinen and Keith Cheverst are selecting next lucky lure



Class 2014 instructors enjoying dessert
No worries – the boat is not sinking 😊



Class 2016 enjoying sun set



Class 2017 instructor Alex Aurigi reeled in the pike that hit the lucky lure selected by Vice Rector Helka-Liisa Hentilä

SCHOOL DINNER

Saturday June 17 at 20:00

Location: Johteenpooki, Kansankentäntie 11 (<https://goo.gl/maps/GwSWpm9u5BnmBQy56>).

Transportation: Bus to School Dinner departs from summer school site at 19:30 and from Nallikari Holiday Village at 19:45.

Program: Welcoming words, dinner buffet, speeches, presentation of awards, music, sauna and outdoor hot tub (towels are provided), late night sausages, Timppa's outdoor fire pancakes.

Menu: Gardener's salad with house dressing, chicken salsa salad, grilled vegetables, feta iced salmon with creamy potatoes, bell peppers stuffed with quinoa and cheese, Indian chickpea vegetable curry, tomato tofu stew, baguette with spread.

Dress code: Casual.



Johteenpooki



Class 2011 Memorable Madness Award recipients



Class 2012 instructors skinny dipping at Nallikari Beach



Class 2013 instructors



Class 2015 project team "Lost Connection" posing with their Distinguished Project Award along instructor Mark Shepard



Class 2017 Distinguished Project Award recipients

SUMMER SCHOOL SITE

UNIVERSITY OF OULU, LINNANMAA CAMPUS, TIETOTALO BUILDING, DOOR E

Address: Erkki Koiso-Kanttilan katu 3 (<https://goo.gl/maps/BEm2bZHAy5Jzsdx8>)

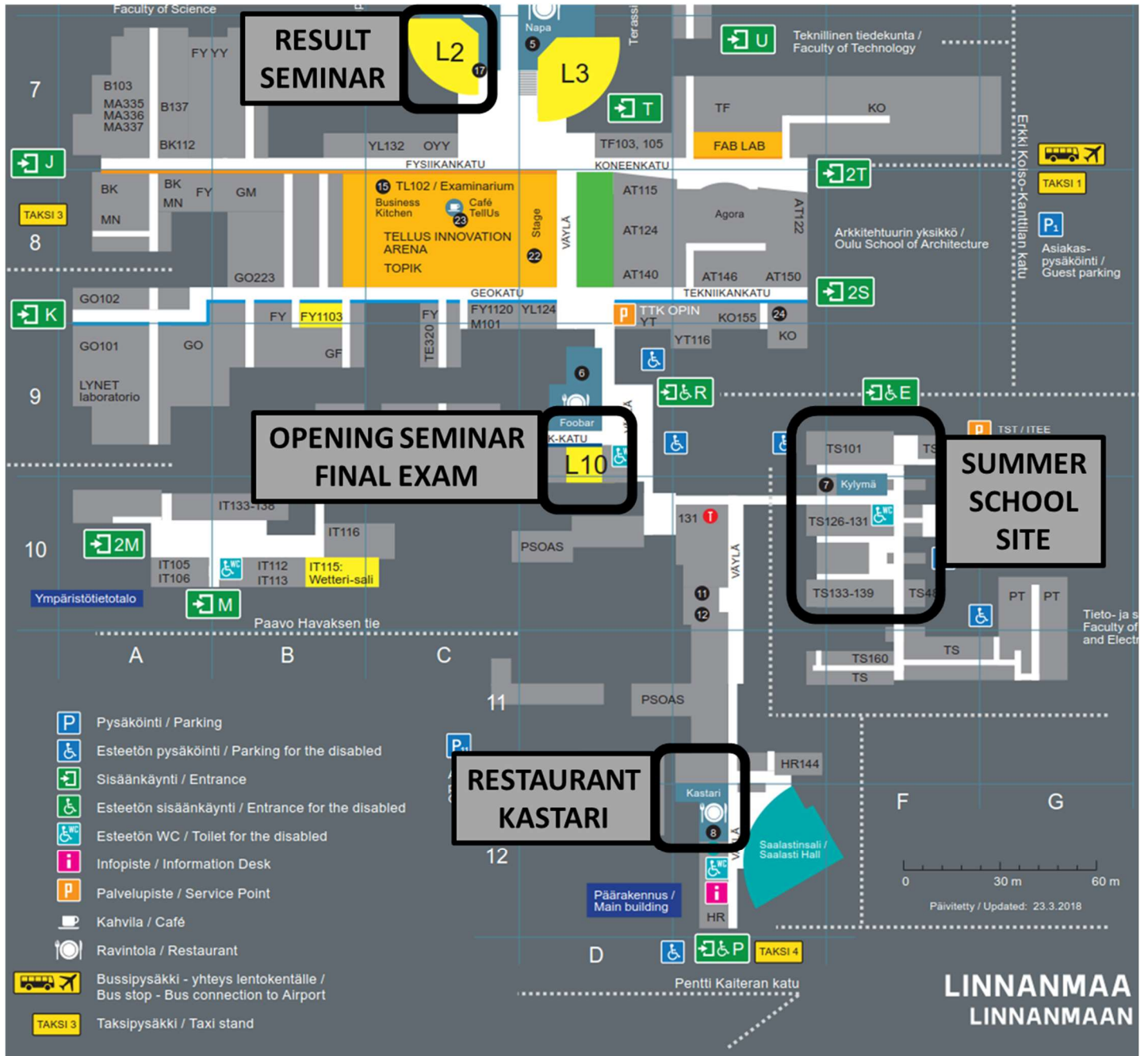


KEY LOCATIONS ON CAMPUS

"Oulu Campus Navigator" available in Android and iOS app stores

<https://play.google.com/store/apps/details?id=fi oulu.oulucampusnavigator&hl=en>

<https://apps.apple.com/fi/app/oulu-campus-navigator/id1461059229?l=fi>



ACCOMMODATION IN NALLIKARI HOLIDAY VILLAGE

Out of town students can purchase low-cost accommodation (78 EUR/day/pp in single bedroom; 39 EUR/day/pp in twin bedroom) in a luxurious villa in Nallikari Holiday Village located in a scenic setting next to Nallikari Beach.

- Address: Leiritie 10 (<https://goo.gl/maps/HToXgXib2w2sabDr7>).
- Phone: +358 44 703 1353.
- Onsite security guard daily at 19-05, phone +358 44 703 1329.
- Web: <http://www.nallikari.fi>.
- Email: reception@nallikari.fi.
- Reception is open daily 8–23.
- Check-in time is 15:00.
- Check-out time is 11:00.
- Free WiFi: SSID *Nallikari-Guest*, password *nallikari2022*.



Sunset in Nallikari



Poiju villa



Nallikari Holiday Village and Nallikari Beach

TRANSPORTATION

PREBOOKED TAXIS FOR ARRIVAL/DEPARTURE TRANSPORTATION

Out of town students are offered a chance to sign up for prebooked taxis for arrival/departure transportation between Oulu airport and train station and Nallikari Holiday Village.

UBISS CHARTER BUSES

In Nallikari Holiday Village the charter bus stops in front of the reception (Leiritie 10).

DATE	TIME	DEPARTURE LOCATION	DESTINATION
Mon June 12	8:15	Nallikari Holiday Village	Summer School Site
Mon June 12	22:00	Science Garden (Get Together Party)	Nallikari – downtown
Tue June 13	9:15	Nallikari Holiday Village	Summer School Site
Tue June 13	18:15	Summer School Site	Nallikari Holiday Village (via downtown)
Wed June 14	9:15	Nallikari Holiday Village	Summer School Site
Wed June 14	18:15	Summer School Site	Market place (Dinner Boat Cruise) (via Nallikari Holiday Village)
Wed June 15	18:45	Summer School Site	Market place (Dinner Boat Cruise)
Wed June 14	22:00	Market place	Nallikari Holiday Village - Linnanmaa Campus
Wed June 14	24:00	Market place	Nallikari Holiday Village - Linnanmaa Campus
Thu June 15	9:15	Nallikari Holiday Village	Summer School Site
Thu June 15	18:30	Summer School Site	Nallikari Holiday Village
Fri June 16	9:30	Nallikari Holiday Village	Summer School Site
Fri June 16	18:30	Summer School Site	Nallikari Holiday Village
Sat June 17	8:15	Nallikari Holiday Village	Summer School Site
Sat June 17	11:45	Nallikari Holiday Village	Summer School Site
Sat June 17	18:00	Summer School Site	Nallikari Holiday Village
Sat June 17	19:30	Summer School Site	Johteenpooki (School Dinner) (via Nallikari Holiday Village 19:45)

LOCAL BUSES

One-time ticket valid for 1 hour costs 3.30 EUR. 24-hour ticket costs 8.80 EUR. Tickets are purchased with cash from the driver or as a mobile ticket using a mobile app available for Android and iOS devices in respective app stores and at <http://www.payiq.net/oulu/>.

Buses 1, 2, 3 and 8 operate frequently between the summer school site (bus stop “Yliopisto E” for buses going towards downtown) and downtown (bus stop “Kaupungintalo P” for buses going to summer school site). Schedules are available on <https://www.oulunliikenne.fi/> or in Google Maps (search for the desired bus stop).

LOCAL TAXI

OTAXI call center: +358 600 300 81

OTAXI mobile app: <https://www.otaxi.fi/en/otaxi-services/otaxi-app/>

COMMUNICATION AND SOCIAL MEDIA

EMAIL LISTS

Everybody: ubiss-all@lists.oulu.fi Workshop A: ubiss-a@lists.oulu.fi
 Instructors: ubiss-instructors@lists.oulu.fi Workshop B: ubiss-b@lists.oulu.fi
 Staff: ubiss-staff@lists.oulu.fi Workshop C: ubiss-c@lists.oulu.fi

SOCIAL MEDIA



<https://discord.gg/HmHzHyHa>



<https://vimeo.com/groups/315324>



#UBISS2023, @ubissoulu



#UBISS2023, @ubicomp_oulu



<https://www.flickr.com/groups/2706010@N22/pool/page5>

PHONE NUMBERS

Workshops			
A	Instructor	Victoria Interrante	+1 952 484 9156
	Instructor	Matti Pouke	+358 40 546 0916
	Instructor	Paula Alavesa	+358 44 511 6477
	Liaison student	Eetu Laukka	+358 46 581 5773
B	Instructor	Petar Popovski	+45 21 94 78 73
	Instructor	Israel Leyva Mayorga	+358 41 794 4915
	Instructor	Shashi Raj Pandey	+358 41 794 4919
	Teaching assistant	Konstantin Mikhaylov	+358 44 245 2292
	Liaison student	Mehrdad Kaheh	+358 41 476 0257
C	Instructor	Kara D. Federmeier	+358 41 794 4914
	Instructor	Evan G. Center	+358 50 567 7216
	Instructor	Ryan J. Hubbard	+1 661 816 7368
	Instructor	Melissa Troyer	+358 41 794 4916
	Liaison student	Katherine Mimnaugh	+358 46 581 5773
Summer school staff			
Chair	Timo Ojala		+358 40 567 6646
Co-chair of the organizing committee	Başak Sakçak		+358 45 602 6793
Co-chair of the organizing committee	Aku Visuri		+358 41 752 6523
Lab engineer	Hannu Rautio		+358 40 508 9952
General services			
Taxi	(24 hours)		+358 600 300 81
City of Oulu tourist office	(office hours)		+358 8 558 41330
Directory services	(24 hours)		0100100, 020202
Emergency	(24 hours)		112

ASSORTED PRACTICAL MATTERS

REGISTRATION FEE: 300 EUR

Registration fee covers participation in one (1) workshop, social program, local transportation, daily lunches in a campus restaurant and free refreshments at the summer school site.

CREDITS AND CERTIFICATES

Credits: 5.0 ECTS (subject to approval by a participant's home university).

All participants should verify beforehand the passing criteria of (postgraduate) studies enforced by their home university. At some universities participation is sufficient for credits while some universities such as the University of Oulu require passing a final exam.

The passing criteria for the students of the University of Oulu are as follows:

1. Full participation in the selected workshop, including the opening seminar (International UBICOMP Seminar 2023).
2. Successful contribution to a project completed during the workshop. The project contributes 50% of the final grade on scale: Fail, 1 (lowest passing grade) - 5 (highest passing grade).
3. Passing the final exam based on a reading package selected by the instructor and the material presented during the workshop. The final exam contributes 50% of the final grade on scale: Fail, 1 (lowest passing grade) - 5 (highest passing grade).

A certificate of participation will be awarded to all students who complete requirements 1 and 2, and pay the registration fee. This certificate of participation does not include the final grade.

A separate certificate of passing the summer school with a particular final grade will be awarded to all students who complete requirements 1, 2 and 3, and pay the registration fee.

DAILY LUNCHES

Registration package includes lunch vouchers that are valid for a regular or a delicacy lunch in Restaurant Kastari on campus. Lunch hours: Tue-Fri 10:30-13:30, Sat 12:00-13:00. On Monday lunch is exceptionally served in TS101.

UBI CAFÉ

Our own UBI Café serves FREE coffee, tea, cold drinks, cookies, fruits and DIY sandwiches at the summer school site. Opening hours: Mon 8:30-18:15, Tue 9:30-18:15, Wed-Fri 9:30-18:30, Sat 8:30-18:00.

PERSONAL LAPTOPS

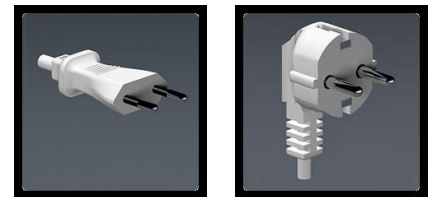
Required for all students.

Student not being able to bring own laptop should contact their liaison student.

Finland uses 220 V / 50 Hz electricity with plug types C and F shown right.

Extension cords will be available in lecture halls.

Adapters can be borrowed from the helpdesk.



WIRELESS INTERNET ACCESS

panOULU WLAN (SSID *panoulu*) providing open (no authentication) and free (no payment) wireless Internet access is available in lecture halls and throughout the City of Oulu in a hotspot manner.

At the University of Oulu campus WLAN access points also advertise SSID *eduroam* that can be used with home organization's user account if the home organization is a member of the Eduroam roaming agreement. *eduroam* provides a secure connection and has higher capacity gateway to the Internet.



PRINTING

Documents to be printed should be emailed in PDF format to ubiss.helpdesk@gmail.com with printing instructions (number of copies, size in A3 or A4, black-and-white vs color, 1-sided vs 2-sided). Ready prints are collected from the helpdesk.

UBISS LEGACY

<p>UBISS 2019 (10th International UBI Summer School), June 10-15, 2020, 83 students from 10 countries in 4 workshops</p> <p>A: FROM REALITY TO VIRTUALITY: THE SCIENCE AND ART OF CREATING VR EXPERIENCES (Prof. Frank Steinicke & Eike Langbehn, University of Hamburg, Germany)</p> <p>B: THE IOT – WIRELESS TECHNOLOGIES AND APPLICATIONS: A JOURNEY FROM ZIGBEE TO 5G (Prof. Roberto Verdone & Assist. Prof. Chiara Buratti, University of Bologna, Italy)</p> <p>C: CRITICAL MAKING: DESIGNING FOR ACTIVISM (Assoc. Prof. Eric Paulos & Assist. Prof. Jill Miller, University of California, Berkeley, USA; Assoc. Prof. Georgi V. Georgiev, University of Oulu, Finland)</p> <p>D: UBIQUITOUS COMPUTING: ENABLING TECHNOLOGICALLY ADVANCED LIVING (Prof. Anind K. Dey, University of Washington, USA; Assist. Prof. Edison Thomaz, University of Texas at Austin, USA; Adj. Prof. Denzil Ferreira, University of Oulu, Finland)</p>
<p>UBISS 2018 (9th International UBI Summer School), June 4-9, 82 students from 15 countries in 4 workshops</p> <p>A: HUMANISTIC HCI (Prof. Jeffrey Bardzell & Prof. Shaowen Bardzell, Indiana University, USA)</p> <p>B: WEARABLE AND MOBILE HEALTH AND BEHAVIOR TRACKING (Prof. Jakob E. Bardram, Technical University of Denmark, Denmark & Adj. Prof. Denzil Ferreira, University of Oulu, Finland)</p> <p>C: DESIGNING FOR THE MARGINS (EXTRA-URBAN INTERACTIONS) (Prof. Alan Dix, Swansea University, UK & Adj. Prof. Simo Hosio, University of Oulu, Finland)</p> <p>D: MAKE. WEAR. MATTER: EXPLORATIONS IN DESIGN, MAKING & CREATIVITY (Prof. Mark D. Gross & Prof. Ellen Yi-Luen Do, University of Colorado Boulder, USA; Adj. Prof. Georgi V. Georgiev, University of Oulu, Finland)</p>
<p>UBISS 2017 (8th International UBI Summer School), June 12-17, 53 students from 9 countries in 4 workshops</p> <p>A: DESIGNING CITY FUTURES THROUGH AUGMENTED PLACE (Prof. Alessandro Aurigi & Dr. Katharine Willis, Plymouth University, UK)</p> <p>B: VIRTUAL CITY MODELS (Prof. Norbert Haala & Patrick Tutzauer, University of Stuttgart, Germany)</p> <p>C: DIGITAL PRODUCT REALIZATION: MAKING THINGS THAT MATTER (Dan Somen, Stanford University, USA & Dr. Georgi V. Georgiev, University of Oulu, Finland)</p> <p>D: AUGMENTED URBAN EXPERIENCE AND MEDIATED SPATIAL NARRATIVES (Reader Ava Fatah gen Schieck & Dr. Simon Julier & Petros Koutsolampros, University College London, UK; Dr. Ana Javornik, Newcastle University, UK)</p>
<p>UBISS 2016 (7th International UBI Summer School), June 13-18, 68 students from 12 countries in 4 workshops</p> <p>A: UBICOMP IN THE WILD: DEVELOPING AND DEPLOYING PERVASIVE DISPLAYS (Prof. Nigel Davies & Dr. Sarah Clinch, Lancaster University, UK)</p> <p>B: EYEWORX: DESIGNING INTERACTIONS WITH EYE MOVEMENTS (Prof. Hans Gellersen, Lancaster University, UK & Dr. Eduardo Velloso, University of Melbourne, Australia)</p> <p>C: COLLABORATION AND PERSONAL DEVICES AROUND INTERACTIVE DISPLAYS (Prof. Giulio Jacucci, University of Helsinki, Finland & Petri Savolainen, HIIT, Finland)</p> <p>D: NEXT GENERATION VIRTUAL REALITY: PERCEPTION MEETS ENGINEERING (Prof. Steve LaValle & Dr. Anna Yershova, UIUC, USA)</p>
<p>UBISS 2015 (6th International UBI Summer School), June 8-13, 56 students from 14 countries in 4 workshops</p> <p>A: SENSOR-BASED INTELLIGENT MOBILE INTERFACES (Dr. Per Ola Kristensson, University of Cambridge, UK)</p> <p>B: DESIGN FICTIONS FOR DATA GEOGRAPHIES (Associate Prof. Mark Shepard, The State University of New York, USA)</p> <p>C: DESIGNING GAMES FOR THE BODY (Associate Prof. Florian 'Floyd' Mueller, RMIT University, Australia)</p> <p>D: 3D WEB AND OPEN DATA FOR SMART CITIES HACKATHON (Prof. Timo 'Timppa' Ojala, University of Oulu, Finland)</p>
<p>UBISS 2014 (5th International UBI Summer School), June 9-14, 59 students from 16 countries in 4 workshops</p> <p>A: DESIGNING URBAN INTERACTIONS FOR PARTICIPATORY PUBLICS (Prof. Martin Brynskov, Aarhus University, Denmark)</p> <p>B: URBAN AUGMENTED REALITY (Prof. Steven Feiner, Columbia University, USA)</p> <p>C: LEARNING FROM PEOPLE TO DESIGN FUTURE "ENJOYING MACHINES" (Prof. Oskar Juhlin, Stockholm University, Sweden)</p> <p>D: DESIGNING BODILY PLAY (Dr. Florian 'Floyd' Mueller, RMIT University, Australia)</p>
<p>UBISS 2013 (4th International UBI Summer School), June 10-15, 76 students from 18 countries in 4 workshops</p> <p>A: EXPERIENCE-DRIVEN DESIGN OF UBIQUITOUS INTERACTIONS IN URBAN SPACES (Prof. Kaisa Väänänen-Vainio-Mattila, Tampere University of Technology, Finland & Dr. Jonna Häkkinä, University of Oulu, Finland)</p> <p>B: DESIGNING MOBILE AUGMENTED REALITY INTERFACES (Prof. Mark Billinghurst, University of Canterbury, New Zealand)</p> <p>C: DEVELOPING UBIQUITOUS COMPUTING DEVICES (Prof. Albrecht Schmidt, University of Stuttgart, Germany)</p> <p>D: URBAN RESOURCE NETWORKS (Prof. Malcolm McCullough, University of Michigan, USA)</p>
<p>UBISS 2012 (3rd International UBI Summer School), May 28 - June 2, 51 students from 10 countries in 3 workshops</p> <p>A: INFORMATION VISUALISATION FOR UBICOMP DATA (Prof. Aaron Quigley, University of St. Andrews, Scotland)</p> <p>B: SUPPORTING COMMUNITY THROUGH INTERACTIVE PUBLIC DISPLAYS (Dr. Keith Cheverst, Lancaster University, UK)</p> <p>D: URBAN SENSORIA: HUMAN-CENTERED COMPUTING IN PRACTICE (Dr. Alejandro 'Alex' Jaimes, Yahoo! Research)</p>
<p>UBISS 2011 (2nd International UBI Summer School), May 23-28, 36 students from 6 countries in 3 workshops</p> <p>A: OPEN PERVASIVE DISPLAY NETWORKS (Dr. Adrian Friday, Lancaster University, UK)</p> <p>D: EMBEDDED WEB SERVICES (Chief Nerd Zach Shelby, Sensinode Ltd., Finland)</p> <p>E: SOCIAL AND CULTURAL ASPECTS OF NEW MEDIA (Prof. Leopoldina Fortunati, University of Udine, Italy)</p>
<p>UBISS 2010 (1st International UBI Summer School), May 31 - June 4, 72 students from 20 countries in 6 workshops</p> <p>A: REAL WORLD CONTEXT-AWARE SYSTEMS (Prof. Anind Dey, CMU, USA)</p> <p>B: URBAN INFORMATICS AND SUSTAINABLE CITIES (Prof. Marcus Foth & Dr. Jaz Choi, QUT, Australia; Patrick Hofmann, Google)</p> <p>C: URBAN SOCIAL NETWORKS ANALYSIS (Prof. Vassilis Kostakos, University of Madeira, Portugal)</p> <p>D: CREATING AND SHARING ARTISTIC EXPERIENCES WITH UBIQUITOUS TECHNOLOGY (Dr. Jürgen Scheible, Aalto University, Finland)</p> <p>E: IP-BASED WIRELESS SENSOR NETWORKS (Head of Research Zach Shelby, Sensinode, Finland)</p> <p>F: INTERACTIVE TEXTURES – RETHINKING MATERIALITY (Prof. Mikael Wiberg, Umeå University, Sweden)</p>

ORGANIZERS



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OF OULU**

ubicomp oulu.fi

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Professor Timo Ojala

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