



**UNIVERSITY
OF TURKU**

**TURKU COLLEGIUM
FOR SCIENCE,
MEDICINE AND
TECHNOLOGY
Annual Report
2021**

TCSMT – For Future Leaders in Science

**University of Turku
2022**

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► Welcome to TCSMT

The Turku Collegium for Science and Medicine (TCSM) launched in 2008 with funding from the Consortium comprising the University of Turku and the Turku School of Economics. In January 2021, following the establishment of the Faculty of Technology at the University of Turku, the name of the collegium was changed to the **Turku Collegium for Science, Medicine and Technology** (TCSMT, Luonnontieteiden, lääketieteen ja tekniikan tutkijakollegium).

TCSMT creates a scientifically stimulating and supportive platform for future scientific leaders standing at the forefront of research and innovation. The collegium harbors an international multi- and interdisciplinary research community, and believes that interactions over the usual boundaries have high potential to create groundbreaking discoveries. During the years of operation, the goal has been to establish the collegium as an integral and permanent part of the University of Turku by focusing on the following aims:

- to foster a multidisciplinary, interactive and dynamic community of successful researchers in science, medicine and technology
- to provide support at critical stages of the research career
- to enable scientists to effectively make use of research results
- to create an attractive and supportive environment by facilitating collaboration and enhancing well-being

TCSMT is home to two groups of researchers – Postdoctoral Researchers and Collegium Researchers (Junior Group Leaders). The funding awarded by the collegium is directed to researchers with an evident potential to pursue a career within academia as well as to researchers with clear potential to develop into independent scientists with the support of the collegium. Looking forward, the collegium is and will continue to be an inclusive and welcoming community to successful national and international researchers.

In 2021, the Rector appointed a new TCSMT Management Board. TCSMT is committed to involving affiliated researchers in the decision-making process and the researcher's representative, Collegium Researcher Jetro Tuulari joined

the Board in January 2021. In addition, former Collegium Researcher Teemu Niiranen joined the 2021 Board as a full Professor. TCSMT extends a warm thank you to former Board members and looks forward to continue developing the collegium with the current Management Board in 2021-2023!

Sirpa Jalkanen

Professor, Chair of the TCSMT Board 2021

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► TCSMT - Excellence in Science, Medicine and Technology

The **University of Turku** hosts two research collegia: the **Turku Collegium for Science, Medicine and Technology (TCSMT)** and the **Turku Institute of Advanced Studies (TIAS)**. In 2021, TCSMT was supported by the Faculties of Science, Medicine, and Technology at the University of Turku.

The collegium hosts researchers in the fields of e.g. astronomy, biology, biochemistry, biomedicine, biotechnology, chemistry, clinical medicine, computer science, dentistry, future technologies, geology, geography, information technology, materials science and engineering, mathematics, mechanical engineering, nursing science, physics, and statistics. The scientific fields represented by our Collegium Researchers and Postdoctoral Researchers are described in Figure 1.

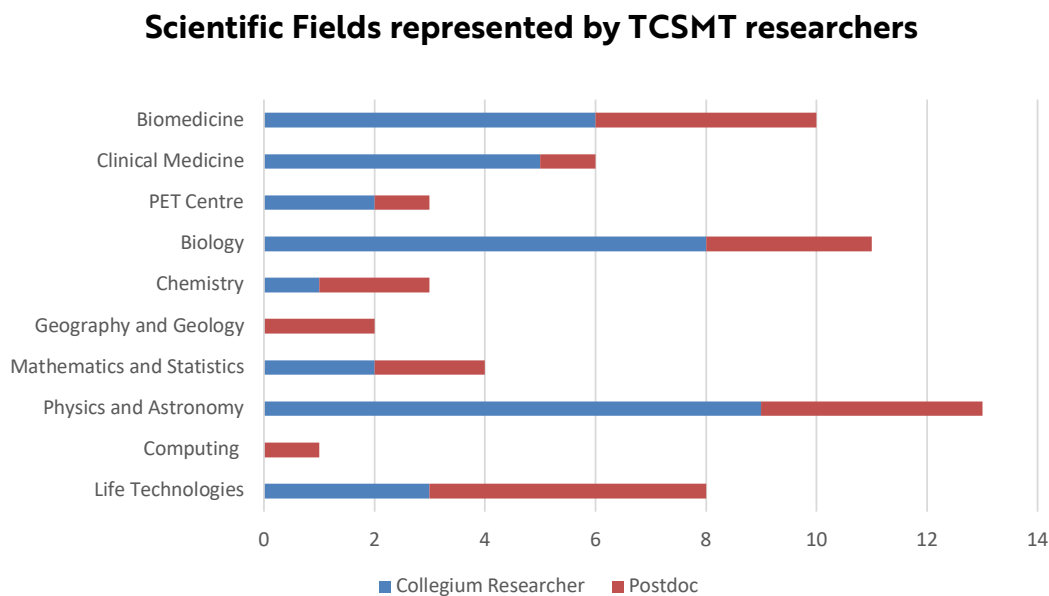


Figure 1. Scientific fields represented by TCSMT researchers recruited 2008-1/2022.

Since 2008, the collegium has hosted 25 Postdoctoral Researchers and 36 Collegium Researchers. TCSMT researchers are very active in both national and international contexts; they create new research networks and generate significant new information. During 2021, researchers at TCSMT produced at least 83 publications; classified by publication type: A1: 63 publications, A2: 14

publications, A4: one publication, B1: three publications, B2: one publication, O2: one publication.

TCSMT alumni embark on successful careers and most continue to work in academic settings. Collegium Researchers have continued on careers within academia as Senior Scientists, Assistant Professors or full Professors (Figure 2, upper panel). During 2021, one Collegium Researcher moved on to a tenure position at the Université de Lyon in France. The Postdoctoral Researchers represent earlier career stages. Most continue within academia, some as Collegium Researchers, others choose careers as experts within the third sector or the government (Figure 2, lower panel).

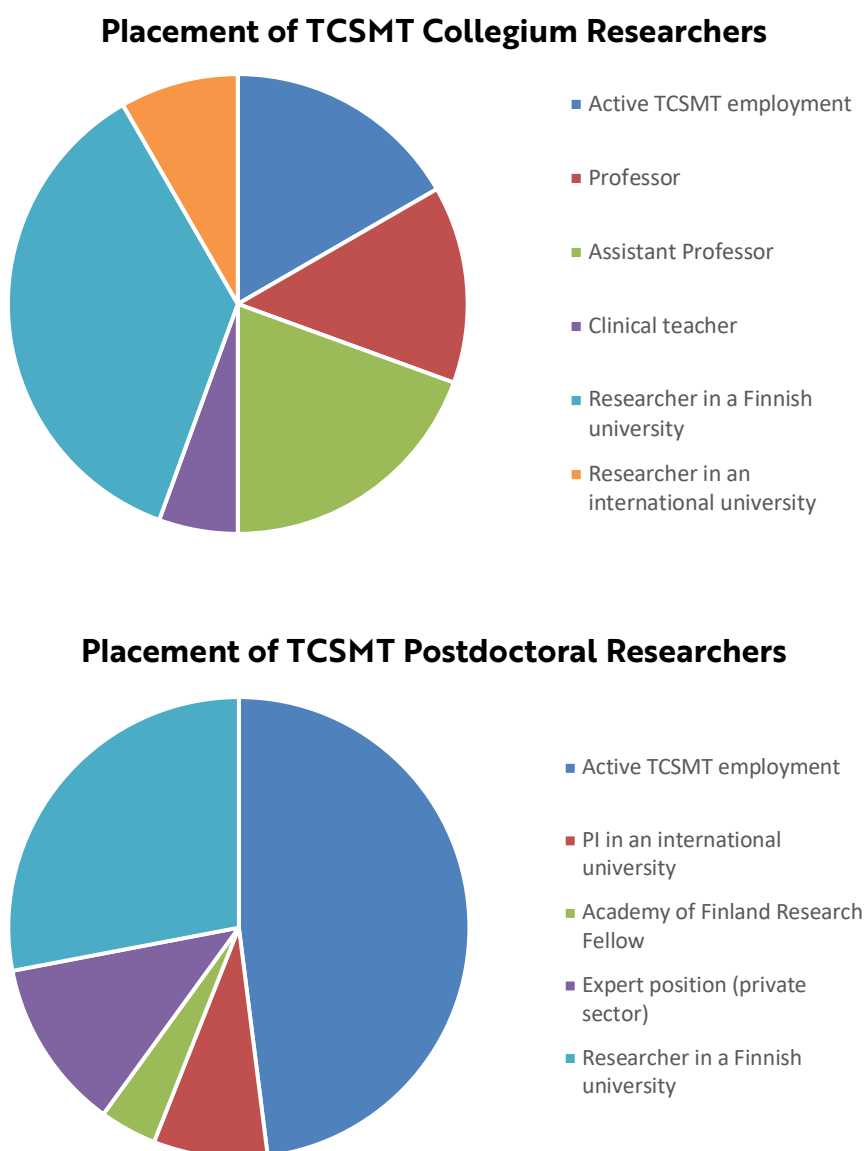


Figure 2. Placement of TCSMT Collegium Researchers (upper panel) and TCSMT Postdoctoral Researchers (lower panel) 2008-1/2022.

TCSMT researchers actively apply for both externally funded research posts and for external funding for their research. The University of Turku Research Funding Unit offers training and support to TCSMT researchers. Since 2008, 29 current and former TCSMT researchers have received funding from the Academy of Finland. Other significant funders have been the Sigrid Jusélius Foundation, the Medical District of Southwest Finland, the Emil Aaltonen Foundation, the Jane and Aatos Erkko Foundation, the Kone Foundation, and numerous other national and international foundations and funders of research.

TCSMT recruits researchers through a highly competitive international call

The TCSMT Board is responsible for organizing the application and review process. TCSMT aims to organize biannual calls for Junior Group Leaders and annual calls for Postdoctoral Researchers. All TCSMT researchers are appointed on fixed-term positions at the University of Turku. Both positions are funded for 3 years at the time, but starting from 2018, Junior Group Leaders have had the possibility to apply for a 2-year extension. TCSMT Collegium Researchers receive a 20.000 € starting grant for three years and an additional 10.000 € for the possible two year extension. In 2021, TCSMT consisted of 20 Researchers, 8 Collegium Researchers and 12 Postdoctoral Researchers.

In the selection process, attention is paid to the applicant's international experience, publications, amount of funding received, research career stage, partners and networks, as well as to how the applicant's research activities fit into the strategy and the collaborative themes of research at the University of Turku. The TCSMT Board makes the decisions on the recruitments taking into account the available resources.

The success rates of eligible applicants range from 2,9-5,9% for Postdoctoral Researcher positions and 2,6-10,6% for Collegium Researcher positions. The next call for TCSMT Postdoctoral Researcher positions and Collegium Researcher positions is planned for the autumn 2022.

Postdoctoral Researchers

A Postdoctoral Researcher has established excellence in research gained through significant international experience. Successful applicants have outstanding potential to advance on their careers and are expected to already have attained academic achievements. An applicant must have completed the doctoral degree by the end of the application period, and no more than five years before applying (not included in the net period are maternity and parental leaves, military service, etc.). The Postdoctoral Researcher must have a connection to research conducted at the University of Turku as the researcher joins an existing research group, or works under the supervision of a senior researcher.

Collegium Researchers

A Collegium Researcher is an ambitious young scientist with outstanding potential and established excellence in research gained through significant international experience as a postdoctoral researcher or equivalent. An applicant must have a doctoral degree certificate awarded a minimum of three years and a maximum of nine years before applying (not included in the net period are maternity and parental leaves, military service, etc.).

► TCSMT Researchers 2021

Postdoctoral Researchers

Faculty of Medicine

Pankaj Singh, Institute of Biomedicine, [ORCHID](#)

Lihua Sun, Turku PET Centre, [ORCHID](#)

Faculty of Science

Thomas Bullock, Department of Physics and Astronomy, [ORCHID](#)

Aino Kalske, Department of Biology, [ORCHID](#)

Tharun Kumar Kotammagari, Department of Chemistry, [ResearchGate](#)

Mikel Calle Navarro, Department of Geography and Geology, [ORCHID](#)

Johannes Nokkala, Department of Physics and Astronomy, [ORCHID](#)

Jarkko Peltomäki, Department of Mathematics and Statistics, [ORCHID](#)

Matteo Rossi, Department of Physics and Astronomy, [ORCHID](#)

Faculty of Engineering

Pande Erawijantari, Department of Computing, [ORCHID](#)

Tuomas Huokko, Department of Life Technologies, [ORCHID](#)

Riikka Peltomaa, Department of Life Technologies, [ORCHID](#)

► Collegium Researchers

Faculty of Medicine

Jianwei Li, MediCity Research Laboratory, [ORCHID](#)

Miho Nakamura, Department of Clinical Medicine, [ORCHID](#)

Jetro Tuulari, Department of Clinical Medicine, [ORCHID](#)

Faculty of Science

Nina Gieseler, Department of Physics and Astronomy, [ORCHID](#)

Erkki Kankare, Department of Physics and Astronomy, [ORCHID](#)

Kimmo Luoma, Department of Physics and Astronomy, [ORCHID](#)

Sophie Reichert, Department of Biology, [ORCHID](#)

Antoine Stier, Department of Biology, [ORCHID](#)

► Publications by TCSMT Researchers 2021

A1 Journal article – refereed

Effects of glaciation on karst hydrology and sedimentology during the Last Glacial Cycle: The case of Granito cave, Central Pyrenees (Spain)

Bartolomé M, Sancho C, Benito G, Medialdea A, **Calle M**, Moreno A, Leunda M, Luetscher M, Muñoz A, Bastida J, Cheng H, Edwards RL. CATENA

A 1400-years flood frequency reconstruction for the Basque country (N Spain): Integrating geological, historical and instrumental datasets

Corella JP, Benito G, Monteoliva AP, Sigro J, **Calle M**, Valero-Garcés BL, Stefanova V, Rico E, Favre AC, Wilhelm B. Quaternary Science Reviews

Basin-wide hydromorphological analysis of ephemeral streams using machine learning algorithms‡

Rabanaque MP, Martínez-Fernández V, **Calle M**, Benito G. Earth Surface Processes and Landforms

Connecting solar flare hard X-ray spectra to in situ electron spectra A comparison of RHESSI and STEREO/SEPT observations

Dresing N, Warmuth A, Effenberger F, Klein KL, Musset S, Glesener L, Brudern M. Astronomy and Astrophysics

The unusual widespread solar energetic particle event on 2013 August 19 Solar origin and particle longitudinal distribution

Rodriguez-Garcia L, Gomez-Herrero R, Zouganelis I, Balmaceda L, Nieves-Chinchilla T, **Dresing N**, Dumbovic M, Nitta NV, Carcaboso F, dos Santos LFG, Jian LK, Mays L, Williams D, Rodriguez-Pacheco J. Astronomy and Astrophysics

Multi-spacecraft observations of the structure of the sheath of an interplanetary coronal mass ejection and related energetic ion enhancement

Kilpua EKJ, Good SW, **Dresing N**, Vainio R, Davies EE, Forsyth RJ, Gieseler J, Lavraud B, Asvestari E, Morosan DE, Pomoell J, Price DJ, Heyner D, Horbury TS, Angelini V, O'Brien H, Evans V, Rodriguez-Pacheco J, Gómez Herrero R, Ho GC, Wimmer-Schweingruber R. Astronomy and Astrophysics

Hydrocarbon Desaturation in Cyanobacterial Thylakoid Membranes Is Linked With Acclimation to Suboptimal Growth Temperatures

Vuorio E, Thiel K, Fitzpatrick D, **Huokko T**, Kämäräinen J, Dandapani H, Aro EM, Kallio P. Frontiers in Microbiology

Probing the biogenesis pathway and dynamics of thylakoid membranes

Huokko T, Ni T, Dykes GF, Simpson DM, Brownridge P, Conradi FD, Beynon RJ, Nixon PJ, Mullineaux CW, Zhang P, Liu LN. *Nature Communications*

Introduced populations of the garden lupine are adapted to local generalist snails but have lost alkaloid diversity

Kalske A, Luntamo N, Salminen J-P, Ramula S. *Biological Invasions*

Strong gene flow explains lack of mating system variation in the perennial herb, *Vincetoxicum hirundinaria*, in a fragmented landscape

Muola A, Scheepens JF, Laukkanen L, **Kalske A**, Mutikainen P, Leimu R. *Nordic Journal of Botany*

Glyphosate residues alter the microbiota of a perennial weed with a minimal indirect impact on plant performance

Ramula S, Mathew SA, **Kalske A**, Nissinen Ra, Saikkonen K, Helander M. *Plant and Soil*

The double-peaked Type Ic supernova 2019cad: another SN 2005bf-like object

Gutierrez CP, Bersten MC, Orellana M, Pastorello A, Ertini K, Folatelli G, Pignata G, Anderson JP, Smartt S, Sullivan M, Pursiainen M, Inserra C, Elias-Rosa N, Fraser M, **Kankare E**, Moran S, Reguitti A, Reynolds TM, Stritzinger M, Burke J, Frohmaier C, Galbany L, Hiramatsu D, Howell DA, Kuncarayakti H, Mattila S, Muller-Bravo T, Pellegrino C, Smith M. *Monthly Notices of the Royal Astronomical Society*

PS15cey and PS17cke: prospective candidates from the Pan-STARRS Search for kilonovae

McBrien OR, Smartt SJ, Huber ME, Rest A, Chambers KC, Barbieri C, Bulla M, Jha S, Gromadzki M, Srivastav S, Smith KW, Young DR, McLaughlin S, Inserra C, Nicholl M, Fraser M, Maguire K, Chen TW, Wevers T, Anderson JP, Muller-Bravo TE, Olivares EF, **Kankare E**, Gal-Yam A, Waters C. *Monthly Notices of the Royal Astronomical Society*

Intermediate-luminosity red transients: Spectrophotometric properties and connection to electron-capture supernova explosions

Cai YZ, Pastorello A, Fraser M, Botticella MT, Elias-Rosa N, Wang LZ, Kotak R, Benetti S, Cappellaro E, Turatto M, Reguitti A, Mattila S, Smartt SJ, Ashall C, Benitez S, Chen TW, Harutyunyan A, **Kankare E**, Lundqvist P, Mazzali PA, Morales-Garoffolo A, Ochner P, Pignata G, Prentice SJ, Reynolds TM, Shu XW, Stritzinger MD, Tartaglia L, Terreran G, Tomasella L, Valenti S, Valerin G, Wang GJ, Wang XF, Borsato L, Callis E, Cannizzaro G, Chen S, Congiu E, Ergon M, Galbany L, Gal-Yam A, Gao X, Gromadzki M, Holmbo S, Huang F, Inserra C, Itagaki K, Kostrzewa-Rutkowska Z, Maguire K, Margheim S, Moran S, Onori F, Carracedo AS, Smith KW, Sollerman J, Somero A, Wang B, Young DR. *Astronomy and Astrophysics*

Forbidden hugs in pandemic times II. The luminous red nova variety: AT 2020hat and AT 2020kog

Pastorello A, Valerin G, Fraser M, Elias-Rosa N, Valenti S, Reguitti A, Mazzali PA, Amaro RC, Andrews JE, Dong Y, Jencson J, Lundquist M, Reichart DE, Sand DJ, Wyatt S, Smartt SJ, Smith KW, Srivastav S, Cai YZ, Cappellaro E, Holmbo S, Fiore A, Jones D, Kankare E, Karamehmetoglu E, Lundqvist P, Morales-Garoffolo A, Reynolds TM, Stritzinger MD, Williams SC, Chambers KC, de Boer TJL, Huber ME, Rest A, Wainscoat R, Rest A, Wainscoat R. *Astronomy and Astrophysics*

Core-collapse supernova subtypes in luminous infrared galaxies

Kankare E, Efstathiou A, Kotak R, Kool EC, Kangas T, O'Neill D, Mattila S, Väisänen P, Ramphul R, Mogotsi M, Ryder SD, Parker S, Reynolds T, Fraser M, Pastorello A, Cappellaro E, Mazzali PA, Ochner P, Tomasella L, Turatto M, Kotilainen J, Kuncarayakti H, Perez-Torres MA, Randriamanakoto Z, Romero-Cañizales C, Berton M, Cartier R, Chen TW, Galbany L, Gromadzki M, Inserra C, Maguire K, Moran S, Müller-Bravo TE, Nicholl M, Reguitti A, Young DR. *Astronomy and Astrophysics*

Forbidden hugs in pandemic times: I. Luminous red nova AT 2019zhd, a new merger in M 31

Pastorello A, Fraser M, Valerin G, Reguitti A, Itagaki K, Ochner P, Williams SC, Jones D, Munday J, Smartt SJ, Smith KW, Srivastav S, Elias-Rosa N, **Kankare E**, Karamehmetoglu E, Lundqvist P, Mazzali PA, Munari U, Stritzinger MD, Tomasella L, Anderson JP, Chambers KC, Rest A, Rest A. *Astronomy and Astrophysics*

SN 2020cpg: An energetic link between Type IIb and Ib supernovae

Medler K, Mazzali PA, Teffs J, Prentice SJ, Ashall C, Amenouche M, Anderson JP, Burke J, Chen TW, Galbany L, Gromadzki M, Gutiérrez CP, Hiramatsu D, Howell DA, Inserra C, **Kankare E**, McCully C, Müller-Bravo TE, Nicholl M, Pellegrino C, Sollerman J. *Monthly Notices of the Royal Astronomical Society*

SN 2019hcc: a Type II supernova displaying early O II lines

Parrag E, Inserra C, Schulze S, Anderson J, Chen TW, Leloudas G, Galbany PL, Gutiérrez C, Hiramatsu D, **Kankare E**, Müller-Bravo T, Nicholl M, Pignata G, Cartier R, Gromadzki M, Kozyreva A, Rau A, Burke J, Howell AD, McCully C, Pellegrino C. *Monthly Notices of the Royal Astronomical Society*

SN 2017gci: a nearby Type I Superluminous Supernova with a bumpy tail

Fiore A, Chen TW, Jerkstrand A, Benetti S, Ciolfi R, Inserra C, Cappellaro E, Pastorello A, Leloudas G, Schulze S, Berton M, Burke J, McCully C, Fong W, Galbany L, Gromadzki M, Gutierrez CP, Hiramatsu D, Hosseinzadeh G, Howell DA, **Kankare E**, Lunnan R, Muller-Bravo TE, O'Neill D, Nicholl M, Rau A, Sollerman J, Terreran G, Valenti S, Young DR. *Monthly Notices of the Royal Astronomical Society*

Enhanced photocatalytic hydrogen production performance of pillararene-doped mesoporous TiO₂ with extended visible-light response

Wu H, Wang M, Jing F, Kong D, Chen Y, Jia C, **Li J**. Chinese Chemical Letters

Self-Synthesizing Nanorods from Dynamic Combinatorial Libraries against Drug Resistant Cancer

Cao Y, Yang J, Eichin D, Zhao F, Qi D, Kahari L, Jia C, Peurla M, Rosenholm JM, Zhao Z, Jalkanen S, **Li J**. Angewandte Chemie International Edition

Quantum-memory-enhanced dissipative entanglement creation in nonequilibrium steady states

Heineken D, Beyer K, **Luoma K**, Strunz WT. Physical Review A

Set Coherence: Basis-Independent Quantification of Quantum Coherence

Designolle S, Uola R, **Luoma K**, Brunner N. Physical Review Letters

Phase space theory for open quantum systems with local and collective dissipative processes

Merkel K, Link V, **Luoma K**, Strunz WT. Journal of Physics A: Mathematical and Theoretical

A Polymer for Application as a Matrix Phase in a Concept of In Situ Curable Bioresorbable Bioactive Load-Bearing Continuous Fiber Reinforced Composite Fracture Fixation Plates

Plyusnin A, He J, Elschner C, **Nakamura M**, Kulkova J, Spickenheuer A, Scheffler C, Lassila LVJ, Moritz N. Molecules

Structural and elemental characterization of glass and ceramic particles for bone surgery

Sirkiä SV, **Nakamura M**, Qudsia S, Siekkinen M, Smått JH, Peltonen J, Heino TJ, Hupa L, Vallittu PK. Dental Materials

Inhibition of osteoclast activities by SCPC bioceramic promotes osteoblast-mediated graft resorption and osteogenic differentiation

El-Ghannam A, **Nakamura M**, Muguruza LB, Sarwar U, Hassan M, Al Fotawi R, Horowitz R. Journal of Biomedical Materials Research Part A

Surface Electric Fields Increase Human Osteoclast Resorption through Improved Wettability on Carbonate-Incorporated Apatite

Bergara-Muguruza L, Mäkelä K, Yrjälä T, Salonen J, Yamashita K, **Nakamura M**. ACS Appl. Mater. Interfaces

Analytical Evidence of Nonlinearity in Qubits and Continuous-Variable Quantum Reservoir Computing

Mujal P, **Nokkala J**, Martínez-Peña R, Giorgi GL, Soriano MC, Zambrini R. *Journal of Physics: Complexity*

Gaussian states of continuous-variable quantum systems provide universal and versatile reservoir computing

Nokkala J, Martínez-Peña R, Giorgi GL, Parigi V, Soriano MC, Zambrini R. *Communications Physics*

Dynamical Phase Transitions in Quantum Reservoir Computing

Martínez-Peña R, Giorgi GC, **Nokkala J**, Soriano MC, Zambrini R. *Phys. Rev. Lett.*

Probing the spectral dimension of quantum network geometries

Nokkala J, Piilo J, Bianconi G. *J. Phys. Complex.*

High-Performance Reservoir Computing With Fluctuations in Linear Networks

Nokkala J, Martínez-Peña R, Zambrini R, Soriano MC. *IEEE Transactions on Neural Networks and Learning Systems*

Biosensing based on upconversion nanoparticles for food quality and safety applications

Peltomaa R, Benito-Peña E, Gorris HH, Moreno-Bondi MC. *Analyst*

Effect of Particle Size and Surface Chemistry of Photon-Upconversion Nanoparticles on Analog and Digital Immunoassays for Cardiac Troponin

Brandmeier JC, Raiko K, Farka Z, **Peltomaa R**, Mickert MJ, Hlaváček A, Skládal P, Soukka T, Gorris HH. *Advanced Healthcare Materials*

Identification of high-affinity phage-displayed VH fragments by use of a quartz crystal microbalance with dissipation monitoring

Gómez-Arribas LN, Juste-Dolz A, **Peltomaa R**, Giménez-Romero D, Morais S, Barderas R, Cuadrado C, Maquieira Á, Benito-Peña E, Moreno-Bondi MC. *Sensors and Actuators B: Chemical*

Recombinant Peptide Mimetic NanoLuc Tracer for Sensitive Immunodetection of Mycophenolic Acid

Luque-Uría Á, **Peltomaa R**, Nevanen TK, Arola HO, Iljin K, Benito-Peña E, Moreno-Bondi MC. *Analytical Chemistry*

Standard words and solutions of the word equation $X_1^2 \dots X_n^2 = (X_1 \dots X_n)^2$

Peltomäki J, Saarela A. *Journal of Combinatorial Theory, Series A*

On prefix palindromic length of automatic words

Frid AE, Laborde E, **Peltomäki J**. Theoretical Computer Science

The elephant in the family: Costs and benefits of elder siblings on younger offspring life-history trajectory in a matrilineal mammal

Berger V, **Reichert S**, Lahdenperä M, Jackson J, Htut W, Lummaa V. Journal of Animal Ecology

Stochastic collision model approach to transport phenomena in quantum networks

Chisholm D, Garcia-Perez G, **Rossi M**, Palma M, Maniscalco S. New Journal of Physics

Structure based designing of thiazolidinone-pyrimidine derivatives as ERK2 inhibitors: Synthesis and in vitro evaluation

Pathania S, **Singh PK**, Narang RK, Rawal RK. SAR and QSAR in Environmental Research

Investigation of indole functionalized pyrazoles and oxadiazoles as anti-inflammatory agents: Synthesis, in-vivo, in-vitro and in-silico analysis

Kumar D, Kumar RR, Pathania S, **Singh PK**, Kalra S, Kumar B. Bioorganic Chemistry

Identifying novel putative ERK1/2 inhibitors via hybrid scaffold hopping -FBDD approach

Pathania S, **Singh PK**, Narang RK, Rawal RK. Journal of Biomolecular Structure and Dynamics

Population differences in the length and early-life dynamics of telomeres among European pied flycatchers

Kärkkäinen T, Laaksonen T, Burgess M, Cantarero A, Martínez-Padilla J, Potti J, Moreno J, Thomson RL, Tilgar V, **Stier A**. Molecular Ecology

Long-term intake of the illegal diet pill DNP reduces lifespan in a captive bird model

Stier A, Bize P, Massemin S, Criscuolo F. Comparative Biochemistry and Physiology - Part C: Toxicology and Pharmacology

Interplays between pre- and post-natal environments affect early-life mortality, body mass and telomere dynamics in the wild

Kärkkäinen T, Teerikorpi P, Schuett W, **Stier A**, Laaksonen T. Journal of Experimental Biology

Within-individual repeatability in telomere length: A meta-analysis in nonmammalian vertebrates

Kärkkäinen T, Briga M, Laaksonen T, **Stier A**. Molecular Ecology

Effects of Heat Waves During Post-natal Development on Mitochondrial and Whole Body Physiology: An Experimental Study in Zebra Finches

Ton R, **Stier A**, Cooper CE, Griffith SC. Frontiers in Physiology

Novel Effects of the Gastrointestinal Hormone Secretin on Cardiac Metabolism and Renal Function

Laurila S, Rebelos E, Lahesmaa M, **Sun L**, Schnabi K, Peltomaa TM, Klén R, U-Din M, Honka MJ, Eskola O, Kirjavainen AK, Nummenmaa L, Klingenspor M, Virtanen KA, Nuutila P. AJP - Endocrinology and Metabolism

Secretin activates brown fat and induces satiation

Laurila S, **Sun L**, Lahesmaa M, Schnabl K, Laitinen K, Klén RLY, Balaz M, Wolfrum C, Steiger K, Niemi T, Taittonen M, U-Din M, Välikangas T, Elo LL, Eskola O, Kirjavainen AK, Nummenmaa L, Virtanen KA, Klingenspor M, Nuutila P. Nature Metabolism

Brain Basis of Psychopathy in Criminal Offenders and General Population

Nummenmaa L, Lukkarinen L, **Sun L**, Putkinen V, Seppälä K, Karjalainen T, Karlsson HK, Hudson M, Venetjoki N, Salomaa M, Rautio P, Hirvonen J, Lauerma H, Tiihonen J. Cerebral Cortex

Seasonal variation in the brain μ -opioid receptor availability

Sun L, Tang J, Liljenbäck H, Honkaniemi A, Virta J, Isojärvi J, Karjalainen T, Kantonen T, Nuutila P, Hietala J, Kaasinen V, Kalliokoski K, Hirvonen J, Scheinin H, Helin S, Eerola K, Savontaus E, Yarkin E, Rinne JO, Roivainen A, Nummenmaa L. Journal of Neuroscience

μ -opioid receptor availability is associated with sex drive in human males

Nummenmaa L, Jern P, Malen T, Kantonen T, Pekkarinen L, Lukkarinen L, **Sun L**, Nuutila P, Putkinen V. Cognitive, Affective, and Behavioral Neuroscience

Emotional Modulation of Frontal Alpha Asymmetry - a Novel Biomarker of Mild Traumatic Brain Injury

Kuusinen V, Peräkylä J, **Sun L**, Ogawa KH, Hartikainen KM. Frontiers in Human Neuroscience

A variation in the infant oxytocin receptor gene modulates infant hippocampal volumes in association with sex and prenatal maternal anxiety

Acosta H, **Tuulari JJ**, Kantojärvi K, Lewis JD, Hashempour N, Scheinin NM, Lehtola SJ, Fonov VS, Collins DL, Evans A, Parkkola R, Lähdesmäki T, Saunavaara J, Merisaari H, Karlsson L, Karlsson H, Paunio T. *Psychiatry Research: Neuroimaging*

Maternal pre-pregnancy BMI associates with neonate local and distal functional connectivity of the left superior frontal gyrus

Rajasilta O, Häkkinen S, Björnsdotter M, Scheinin NM, Lehtola SJ, Saunavaara J, Parkkola R, Lähdesmäki T, Karlsson L, Karlsson H, **Tuulari JJ**. *Scientific Reports*

Prevalence and evolution of snoring and the associated factors in two-year-old children

Katila M, Saarenpää-Heikkilä O, Saha MT, Vuorela N, Huhtala H, Korhonen LS, Lukkarinen M, **Tuulari JJ**, Karlsson L, Karlsson H, Paavonen EJ. *Sleep Medicine*

Neonatal Amygdala Volumes and the Development of Self-Regulation from Early Infancy to Toddlerhood

Nolvi S, **Tuulari JJ**, Pelto J, Bridgett DJ, Eskola E, Lehtola SJ, Hashempour N, Korja R, Kataja EL, Saunavaara J, Parkkola R, Lähdesmäki T, Scheinin NM, Fernandes M, Karlsson L, Lewis JD, Fonov VS, Collins DL, Karlsson H. *Neuropsychology*

Associations Between Brain Gray Matter Volumes and Adipose Tissue Metabolism in Healthy Adults

Raiko JRH, **Tuulari JJ**, Saari T, Parkkola R, Savisto N, Nuutila P, Virtanen K. *Obesity*

Age and sex differences in the cortisol stress reactivity and recovery among infants exposed to prenatal psychological distress

Kortesuoma S, Korhonen LS, Pelto J, **Tuulari JJ**, Karlsson L, Karlsson H. *Psychoneuroendocrinology*

A2 Review article in a scientific journal

[Quantum state discrimination via repeated measurements and the rule of three.](#)

Bullock T, Heinosaari, T. Quantum Stud.: Math. Found.

[First near-relativistic solar electron events observed by EPD onboard Solar Orbiter](#)

Gómez-Herrero R, Pacheco D, Kollhoff AF, Espinosa L, Freiherr von Forstner JL, **Dresing N**, Lario D, Balmaceda L, Krupar V, Malandraki OE, Aran A, Bučík R, Klassen A, Klein KL, Cernuda I, Eldrum S, Reid H, Mitchell JG, Mason GM, Ho GC, Rodríguez-Pacheco J, Wimmer-Schweingruber RF, Heber B, Berger L, Allen RC, Janitzek NP, Laurenza M, De Marco R, Wijzen N, Kartavykh YY, Dröge W, Horbury TS, Maksimovic M, Owen CJ, Vecchio A, Bonnín X, Kruparova O, Píša D, Souček J, Louarn P, Fedorov A, O'Brien H, Evans V, Angelini V, Zucca P, Prieto M, Sánchez-Prieto S, Carrasco A, Blanco JJ, Parra P, Rodríguez-Polo O, Martín C, Terasa JC, Boden S, Kulkarni SR, Ravanbakhsh A, Yedla M, Xu Z, Andrews GB, Schlemm CE, Seifert H, Tyagi K, Lees WJ, Hayes J. A&A Vol 656

[Earth-affecting solar transients: a review of progresses in solar cycle 24](#)

Zhang J, Temmer M, Gopalswamy N, Malandraki O, Nitta NV, Patsourakos S, Shen F, Vrsnak B, Wang YM, Webb D, Desai MI, Dissauer K, **Dresing N**, Dumbovic M, Feng XS, Heinemann SG, Laurenza M, Lugaz N, Zhuang B. Progress in Earth and Planetary Science

[Opportunities in Quantum Reservoir Computing and Extreme Learning Machines](#)

Mujal P, Martínez-Peña R, **Nokkala J**, García-Beni J, Giorgi GL, Soriano MC, Zambrini R. Advanced Quantum Technologies

[Recombinant antibodies and their use for food immunoanalysis](#)

Peltomaa R, Barderas R, Benito-Peña E, Moreno-Bondi MC. Analytical and Bioanalytical Chemistry

[Piperazine, a Key Substructure for Antidepressants: Its Role in Developments and Structure-Activity Relationships](#)

Kumar RR, Sahu B, Pathania S, **Singh PK**, Akhtar MJ, Kumar B. ChemMedChem

[A holistic view on c-Kit in cancer: Structure, signaling, pathophysiology and its inhibitors](#)

Pathania S, Pentikäinen OT, **Singh PK**. BBA - Reviews on Cancer

Von Willebrand factor: A key glycoprotein involved in thrombo-inflammatory complications of COVID-19

Choudhary S, Sharma K, **Singh PK**. Chemico-Biological Interactions

RdRp (RNA-dependent RNA polymerase): A key target providing anti-virals for the management of various viral diseases

Pathania S, Rawal RK, **Singh PK**. J Mol Struct

Analyzing FDA-approved drugs for compliance of pharmacokinetic principles: should there be a critical screening parameter in drug designing protocols?

Pathania S, **Singh PK**. Expert Opinion on Drug Metabolism & Toxicology

Identification of new fisetin analogs as kinase inhibitors: Data on synthesis and anti-skin cancer activities evaluation

Roy T, Boateng ST, Banang-Mbeumi S, **Singh PK**, Basnet P, Chamcheu RCN, Ladu F, Chauvin I, Spiegelman VS, Hill RA, Kousoulas KG, Nagalo BM, Walker AL, Fotie J, Murru S, Sechi M, Chamcheu JC. Data in Brief

Integrating Mitochondrial Aerobic Metabolism into Ecology and Evolution_

Koch RE, Buchanan KL, Casagrande S, Crino O, Dowling DK, Hill GE, Hood WR, McKenzie M, Mariette MM, Noble DWA, Pavlova A, Seebacher F, Sunnucks P, Udino E, White CR, Salin K, **Stier A**. Trends in Ecology and Evolution

Infant and Child MRI: A Review of Scanning Procedures_

Copeland A, Silver E, Korja R, Lehtola SJ, Merisaari H, Saukko E, Sinisalo S, Saunavaara J, Lähdesmäki T, Parkkola R, Nolvi S, Karlsson L, Karlsson H, **Tuulari JJ**. Frontiers in Neuroscience

A systematic review of MRI studies of language development from birth to 2 years of age

Silver E, Korja R, Mainela-Arnold E, Pulli EP, Saukko E, Nolvi S, Kataja EL, Karlsson L, Karlsson H, **Tuulari JJ**. Dev Neurobiol.

A4 Article in conference proceedings

Quantum reservoir computing in bosonic networks

Mujal P, **Nokkala J**, Martínez-Peña R, García-Beni J, Giorgi GL, Soriano MC, Zambrini R. SPIE Nanoscience + Engineering, Proceedings of SPIE : the International Society for Optical Engineering

B1 Journal article

Enhanced photocatalytic hydrogen production under visible light of an organic-inorganic hybrid material based on enzo[1,2-b:4,5-b']dithiophene polymer and TiO₂

Jing F, Guo Y, Li B, Chen YF, Jia C, Li J. Chinese Chemical Letters

A micro-wave strategy for synthesizing room temperature phosphorescent materials

Liang R, Huo L, Yu A, Wang J, Jia C, Li J. Chinese Chemical Letters

Human blood contains circulating cell-free mitochondria, but are they really functional?

Stier A. AJP - Endocrinology and Metabolism

B2 Book section

Concepts and experimental protocols of modelling and informatics in drug design

Silakari O, **Singh PK**, Academic Press

O2 Other

Learning to measure: adaptive informationally complete POVMs for near-term quantum algorithms

García-Pérez G, **Rossi MAC**, Sokolov B, Tacchino F, Barkoutsos PKI, Mazzola G, Tavernelli I, Maniscalco S.

► The University of Turku Collegia TCSMT & TIAS Blog and TCSMT Activities

The [University of Turku Collegia Blog](#) has been running since the autumn 2019. All TCSMT researchers have the opportunity to contribute to the Blog. The aim of the blog is to gain visibility for the collegia and its researchers. The topics of the posts are not defined; instead, the blog is a forum for researchers describe their work and communicate about science. The blog also welcomes personal opinions about careers within academia and about working as researchers at the University of Turku. The blog is used as a tool for conveying thoughts and feelings about topics related to research in general and life in Turku, Finland. TCSMT researchers also communicate actively about relevant publications, research innovations, lecture series, and awards and merits on [twitter](#).

One central aim of TCSMT is to support career development, networking and researcher collaboration through events, annual meetings and training. TCSMT researchers are invited to participate in career discussions with the Board members and network with Board members at TCSMT events. All researches employed by the University of Turku have the opportunity to participate in Staff Training. In 2021, TCSMT organized training related to applying for research funding. TCSMT also aims to invite prominent speakers to facilitate discussions. In May 2021, Professor Yrjö Neuvo, retired Director of Technology at Nokia, gave a talk on why researchers should keep an open mind to industry/academia collaborations. This event led to discussions on innovation and the commercialization of research outputs. TCSMT will thus continue to explore how to strengthen interactions with industrial partners in the future.

TCSMT has also continued to organize events jointly with TIAS and other postdoctoral programmes. In 2021, two joint online events were organized: the Sustainability and Academic Research - UTU Researchers Contributing to Sustainability event took place on 4 June 2021 and the Scientific Knowledge Meets Humbug: an event for post doc researchers at the University of Turku was organized on 11 June 2021.

TCSMT researchers are encouraged to give feedback to the collegium and ideas on how to develop the activities in TCSMT are welcomed. An [annual reporting tool](#) was introduced in 2021 to collect data on the research carried out at TCSMT and on the merits of the collegium's researchers (e.g. success in funding applications, teaching and mentoring activities, and participation in social outreach actions). TCSMT also launched an [Exit Survey](#) for collecting feedback on the collegium period from researchers advancing on their scientific careers.

► University of Turku Research Collegia Lecture Series

The sister collegia of the University of Turku, TCSMT and TIAS, have continued to organize a **public lecture series at the Turku City Library**. The lectures offer a peek into the research conducted at the collegia. The subjects of the lectures range from supernovae to welfare, the wonders of nature and machine learning. The lecture series will also be arranged in the future, as social outreach activities increase the positive attitudes towards science and research in the society.

11 October, TCSMT Collegium Researcher Erkki Kankare: Supernova kerran vuodessa - kirkkaat infrapunagalaksit tehtailevat tähtien räjähdymiä

Omaan Linnunrataamme verrattuna niin sanotuissa kirkkaissa infrapunagalakseissa syntyy paljon runsaammin uusia tähtiä ja täten niissä myös räjähtää paljon useammin supernovia, jopa vuosittain. Optiset supernovien etsintäohjelmat eivät kuitenkaan löydä monia niistä, johtuen näiden galaksien kirkkaudesta ja niissä olevasta tähtienvälisestä pölystä. Mitä näistä supernovista ja niiden emogalakseista tiedetään?

18 October, TIAS Collegium Researcher Karoliina Lummaa: Mitä aineetonta metsä antaa?

Taiteelliset ja tieteelliset metsistä puhumisen tavat risteävät nyt kiinnostavasti. Luonnonvarahallinnassa tunnustetaan kulttuuriset hyödyt, joita metsäluonto tuottaa. Ekologista tutkimustietoa ja käsitteistöä hyödynnetään taiteessa. Taiteen ja tieteen näkökulmissa yhdistyy ajatus metsistä kulttuuriin osallistuvina toimijoina, joita uhkaavat monet ympäristömuutokset. Esitelmässäni tarkastelen tämänhetkisiä metsäkeskusteluja ja -esityksiä metsien kulttuuristen merkitysten näkökulmasta.

25 October, TCSMT Collegium Researcher Jetro Tuulari: Aivoverkot ja aivojen toiminnallinen järjestäytyminen

Kuluneen vuosikymmenen aikana aivojen toiminnallinen järjestäytyminen on ollut kiivaan tutkimuksen kohteena. Luento käsittelee sitä miten koko aivojen toimintaa voidaan mallintaa verkostomallinuksien keinoin ja antaa esimerkkejä menetelmien sovelluksesta.

1 November, TIAS Postdoctoral Researcher Mona Mannevo: Työssä väsyminen eilen ja tänään

Työuupumus mielletään usein kiihkeän nykytyöelämän vitsaukseksi. Työssä ilmenevä väsymys on kuitenkin saanut lääkärin ja psykologit ymmällään kautta teollisen historian. Tarkastelen esityksessäni sitä, miten suomalaisessa työlääkätieteessä suhtauduttiin työssä väsymiseen 1950- ja 1960-luvuilla. Millainen on työuupumuksen nykyisyyden historia?

8 November, TCSMT Postdoctoral Researcher Johannes Nokkala: Mitä on koneoppiminen? Lyhyt johdanto fyysikon näkökulmasta.

Koneoppimisella tarkoitetaan muunmuassa algoritmeja joita voi muokata tuottamaan halutun lopputuloksen antamalla niille esimerkkejä. Tällaiset algoritmit voivat oppia tunnistamaan vaikkapa puhetta tai kasvoja vaikka emme osaisikaan käsin ohjelmoida tarvittua muunnosta puheesta tekstiksi tai valokuvasta henkilöksi. Esittelen lyhyesti aiheen ja annan havainnollistavia esimerkkejä omasta tutkimuksestani missä sovellan koneoppimista fyysisiin systeemeihin.

15 November, TCSMT Collegium Researcher Nina Gieseler: Energetic particles from the Sun observed in a new space era

Explosions at the Sun create high-energy particles that can become a radiation hazard to human health and technology when hitting the Earth. Working towards a forecast of this 'space weather,' we use spacecraft measurements of several interplanetary missions. We discuss how the recently grown fleet of spacecraft can be employed to address long-outstanding questions regarding the generation and transport of solar energetic particles.

► Management Board of TCSMT 2021

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► Further information

For further information, please visit [Turku Collegium for Science, Medicine and Technology website](#).

Follow us on twitter at [@TCSMT_UTU](#)

For more information, you may also contact TCSMT Coordinator [Nina Blom](#).



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