Prof. Arho Suominen

Silvolanrinne 10 as. 4
20540 Turku, Finland
arho.suominen@gmail.com
+358 (50) 5050 354

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KEY EXPERIENCE

- **Research focus on novel indicators of innovation and foresight**, specifically the impact of technological and societal change to innovation systems.
- **Technical expertise** from defence technology, electronics, data science and telecommunications sector with knowledge in ML/AI, Metaverse, Industry 5.0
- **Hired, led and developed a team** of 8 researchers and data analyst. Was a **member in business area leadership team** setting R&D strategy
- Industrial research experience within a technology R&D organization. **Managed a research portfolio of over 1Meuro**, leading all aspects of research. Many project run with cross-cultural and multidisciplinary teams.
- **Communicate insights to C-level audience** in an advisory role regularly, participated 20+ project steering groups,
- Experience developing partnerships with diverse stakeholders, ranging from academia to private sector. Most of the 15+ projects I have led, I have also **led partner acquisition.**
- **Experience in technical writing in a scientific or technical field**, as well as grant applications or research proposals. Published 30+ empirical research papers , share expertise 20+ interviews, guest talks and expert panels.
- **Planned and delivered instructional services** to different audiences ranging from undergraduate, graduate to executive MBA. Consistently received evaluation over 4 out of 5 for individual lectures of courses
- Evaluated 20+ full business case proposals from start-ups looking for venture funding. Participated in pitching a deep tech start-up in several funding rounds (seed & early stage). Have been a **member of the board at two start-ups**. Have been a member of internal IP board
- Designated as a **internal advocate and though leader** promoting technological change and analytics. **Run a corporate wide strategy development project**, reporting to EVP, on leading excellence development.

2009 – 2011	**Doctor of Science in Technology, University of Turku** Electronics. 30 November 2011.
2008 – 2009	**Licentiate of Science in Technology, University of Turku** Electronics. 31 December 2009.
2004 – 2008	**Master of Science in Technology, University of Turku** Major Electronics Product Development
2004 – 2008	**Bachelor of Science in Technology, University of Turku** Major Microelectronics and minor in Computer Science
2003 – 2004	**Officers basic degree, National Defence University** Major Electronics

WORK EXPERIENCE

01/24 – **Research Professor, VTT Technical Research Centre of Finland, Espoo**

VTT Technical Research Centre of Finland is the biggest multitechnological applied research organization in Northern Europe. VTT provides high-end technology solutions and innovation services.

I work as a Research professor of Strategic Foresight. I am a scientific leader and a key contributor to VTTs scientific and technological excellence. I am responsible for building a visionary research agenda, leading execution of the agenda to create global scientific excellence, nurturing high ambition level and substance excellence in the organization through inspiring, sparring and mentoring, and developing talents.

I also initiate new research openings and building up solid research portfolios. I am also expected to create international collaboration networks involving academic and industrial partners.

08/19 – **Industry Professor (20%), Tampere University, Tampere, Finland**
Tampere University was created in January 2019 by the merger of the University of Tampere and Tampere University of Technology, which are joining forces to create a new university.

I work as a part-time Industry Professor of forecasting and analytics at Tampere University department of Industrial Engineering. My role is to carry out industry relevant **research on technological forecasting and analytics.** I also lecture and advice to undergraduate and graduate students.

04/19 – 01/2024 **Business analytics & Foresight Manager, Nokia, Espoo**
Nokia Corporation is a Finnish multinational telecommunications, information technology, and consumer electronics corporation.

I worked at Nokia where I managed strategic projects from start to finish, coordinating stakeholders to deliver on-time results to company leadership. I led research initiatives, employing diverse methodologies to gather insights crucial for strategic decision-making. My expertise included market analysis, foresight, financial modeling to identify gaps and business transformation opportunities. I maintained strong relationships with stakeholders, including senior management, and consistently advocated for shaping our long-term strategic vision. I have been recognized for my excellence in the role with recognition awards and long-term incentives.

Key skills:

- Managing complex strategic initiatives in a multinational global company.
- Communication to senior executives.
- Driving business transformation by identifying and making suggestion for action on changes in business environment.
- Complex long-term business modeling.

04/19 – 05/2022 **Principal Scientist, VTT Technical Research Centre of Finland, Espoo**
VTT Technical Research Centre of Finland is the biggest multitechnological applied research organization in Northern Europe. VTT provides high-end technology solutions and innovation services.

In the role I lead a team of experts as a principal scientist. My work focuses on leveraging advanced analytics to identify new business and technological opportunities, strategic planning, understanding market drivers and to develop scenarios to inform technology and business roadmaps. I am independently responsible for acquiring, developing and implementing strategic management and foresight projects, strategic and program evaluations, as well as leading the development of the teams data collection, analysis, and reporting methods. I also do consultancy projects on immaterial property right related issues, such as IPR strategy.

I serve in the senior leadership of the research area contributing to the development and execution of strategic decisions. I am also often called to work with the organizations executive leadership at an advisory role. As a research team leader, I am also responsible for attracting and recruiting top talent for the unit. I am responsible for working closely with internal and external stakeholders to acquiring new projects, development new initiatives and to ensure results from projects are adopted by clients. I work with both public policy actors and companies, actively engaging with executive and senior leadership. In addition to consultancy work, I work as a Principal Investigator in highly competitive research project funded e.g. by the European Commission

Key accomplishments:

- Winning highly competed research grants from European Union and Academy of Finland
- Built new business offerings turning data into actionable recommendations (e.g. development of VTT Technology Radar tool for strategic technology foresight).
- Extensive experience with different analytical tools (i.e. logistic regression, factor analysis, cluster analysis, multidimensional scaling, NLP, supervised and unsupervised learning models) and skilled user of tools (i.e. Power BI, Survey tools, SPSS, Python)
- Daily use in qualitative and quantitative methodologies (i.e. patent analysis, questionnaires, scenarios, expert panels, Delphi, competitive technological analysis, interviews, scanning, data analytics)
- Experience in using multiple and third party data sources in analytics (i.e. patent data, Orbis, social media data)
- Leadership experience as a member of the leadership team and team leader.
- Presenter in high-level conferences, keynotes and to C-level audiences. Good written, oral and presentation abilities for both technical and non-technical audiences
- Led, as project manager, the research institutes change towards new self-organizing excellence teams.

04/13 – 10/21 **Founder & Board Member, Teqmine Analytics Ltd, Helsinki Finland**
Teqmine Analytics Oy was founded in 2013 and based in Helsinki, Finland. We specialize in large–scale IPR, patent, and Science&Technology analysis by developing databases and machine-learning data mining technologies

I co-founded a high growth start-up commercializing large–scale data analytics for immaterial property rights analysis. My responsibilities in the start-up was developing our key technology – natural language processing and modeling. We created a data-driven Software as a Service product planning to revolutionize the value proposition of IPR analytics.

Until 10/17 I was also the Chairman of the Board of Teqmine. During the three years I was chairman, the company has received two rounds of funding from Tekes the Finnish Funding Agency for Innovation and a pre–seed investment from a early stage investor.

During the start-up experience, I gained experience on how to grow a business, identifying new business opportunities, strategic planning to start and develop the new business, developing operational plan and designing and executing strategic plans.

05/18 – **Adjunct Professor, Tampere University, Tampere, Finland**
Tampere University was created in January 2019 by the merger of the University of Tampere and Tampere University of Technology, which are joining forces to create a new university.

I am an adjunct professor of Technology forecasting and analytics. My main tasks at the university relate to teaching and supervisory duties, particularly as these relate to strategic management, forecasting technological change and the analytics relating to it. During the spring semester of 2019 I lectured the course Introduction to Data Science for undergraduate students.

01/13 – 03/19 **Senior Scientist, VTT Technical Research Centre of Finland, Espoo**
VTT Technical Research Centre of Finland is the biggest multitechnological applied research organization in Northern Europe. VTT provides high-end technology solutions and innovation services.

I worked as a Senior Scientist at the Innovations, Economy, and Policy team, that specializes in innovation management and demanding innovation policy assignments. Work included high-level academic research and customer projects with industry, government organisations. Central to my work was being the data scientist in the team, analyzing data, such as patents, scientific publications, social media data and networks of knowledge. Work included both methodological development, defining analytics and creating actionable metrics for different projects. Practical tools used actively in my work are for example Python (e.g. NLTK, Gensim & NetworkX) R, SPSS, Vantagepoint, UCINET, and Gephi among others. My work is done in a multi-project environment, with

projects ranging from tens of thousands of euros to over 500 k€. Much of my work is communicating results to stakeholders, would they be politicians, general public or company executives.

From 2017 on-wards I have been responsible for the VTT level strategic development program on Leading Excellence. The program focuses on redefining company level leadership practises and tools in order to create a more ambitious and agile VTT. In this role I report to the Executive Vice President of VTT.

01/13 – 04/19 **Lecturer (Part-time secondary occupation), University of Turku, Department of Information Technology, Turku**
University of Turku is one the leading universities in Finland, ranked 211th in the international QS World University Rankings. The university has over 20000 students enrolled and has approximately 3000 employees. The Department of Information Technology is a sub-organization of the University. Having approximately 500 enrolled students and a faculty of approximately 50.

Lecturing approximately 3 undergraduate and graduate level courses per academic year as a secondary occupation.

01/07 – 12/12 **University of Turku, Department of Information Technology, Turku**
University of Turku is one the leading universities in Finland, ranked 211th in the international QS World University Rankings. The university has over 20000 students enrolled and has approximately 3000 employees. The Department of Information Technology is a sub-organization of the University. Having approximately 500 enrolled students and a faculty of approximately 50.

Research Assistant: 01/2007 – 01/2008 I started working at the university as a thesis worker. My research was a part of a the Finnish Funding Agency for Technology and Innovation funded project on lead free soldering. My work focused on analyzing the thermal management issues in lead-free wave soldering. While finalizing my thesis project, I took part in designing a research project application on the development of portable fuel cell for the Finnish Funding Agency for Technology and Innovation fuel cell-program. I was also named as an executive group member for the Salo IT-education executive board. The board oversaw the implementation of the joint agreement by the city of Salo and University of Turku on the IT education at the Salo campus. The IT education agreement was budgeted to 600000 euros yearly.

Lecturer: 01/2009 – 12/2009 I moved to the position of Lecturer. I have been responsible for the planning and design of the day to day execution of the IT-departments Product Development major subject curricula. I have also been responsible for 4-5 graduate level Product Development courses as well as being a thesis supervisor in several master thesis work. Working as a lecturer has increased my abilities as a public performer, speaking daily to groups ranging from a few students to a hundred students. I give my lectures mostly in English.

University Teacher: 01/2010 – 12/2012 I continued my work as a teacher of product development. Adding responsibilities included the managerial responsibility of a team of 5 employees and a nomination to the IT-department council from 2010 to 2012. The council, consisting of 12 members, is the departments advisory board. I was also nominated to the Faculty of Mathematics and Natural Sciences council for the term 2011-2012. The Faculty Council makes decisions about e.g. personnel recruitment, dividing the funding allocated to the Faculty, approving the curricula, and matters concerning doctoral and licenciate theses. Work experience at the University of Turku includes a exchange period spent as a Fulbright Visiting Scholar at the Georgia Institute of Technology for the fall semester of 2012.

10/08 – 10/10 **Founder, Advanced Energy Network Oy, Salo** *Advanced Energy Network is a start-up company focusing on developing end-user products from photo-voltaic components. The company set out to develop easy to install systems.*

I was partner in a start-up company developing on-grid and off-grid solar power systems. I joined the company as a technology expert and for product development. Even thought getting off to a good start, the company has had significant challenges in implementing an affordable on-grid solar power system in Finland. I however gained experience on new ventures and working as a member

of an executive board. Im have since sold my shares in the company.

10/07 – 03/08 **Project Manager (part-time), Ailos Technology Oy, Turku** *Ailos Technology is a small consulting company specialized in project management and the process of developing high technology innovations into business. Company is based into Turku*

Part-time project manager responsible of critical systems and applications. My work concentrated in setting up functions in this small IT consulting company.

01/07 – 09/07 **Assistant (part-time), MMe Consulting Oy,Salo** *MMe Consulting is a small product development consulting company offering turn-key product development to small and medium sized companies.*

Part-time assistant in a small consulting firm, main tasks included writing product, test and manufacturing documentation.

RESEARCH

I have published in total 42 peer-reviewed journal articles, 52 conference publications, two book sections and four books. A full list of publications is as an appendix. Publications are also available at my Google Scholar profile[1]

Selected scientific publications

1. Samira Ranaei, Arho Suominen, Alan Porter, Tuomo Kässi. Application of text-analytics in quantitative study of science and technology: advancement, challenges and future directions, in the Springer Handbook of Science and Technology Indicators, Forthcoming
2. Arho Suominen, Hannes Toivanen and Marko Seppänen. Firms' knowledge profiles: Mapping patent data with unsupervised learning. Technological Forecasting and Social Change. 115 (2017): 131-142.
3. Samira Ranaei, Matti Karvonen, Arho Suominen and Tuomo Kässi. Patent-based technology forecasting: case of electric and hydrogen vehicle. International Journal of Energy Technology and Policy. 2016, 12(1), 20-40.
4. Arho Suominen and Hannes Toivanen. Map of science with topic modeling: Comparison of unsupervised learning and human–assigned subject classification. Journal of the Association for Information Science and Technology, 67.10 (2016): 2464-2476.
5. Chyi-Kwei Yau, Alan Porter, Nils Newman, Arho Suominen, Clustering scientic documents with topic modeling, Scientometrics, 100(3), 2014, pp. 767–786.
6. Arho Suominen and Marko Seppänen. Bibliometric Data and Actual Development in Technology Life Cycles: Flaws in Assumptions, Foresight, foresight, 16(1), 2014, pp 37–53.
7. Arho Suominen, Analysis of technological progression by quantitative measures: a comparison of two technologies, Technology Analysis and Strategic Management, 25(6), pp. 687–706

[1] `https://scholar.google.fi/citations?hl=en&pli=1&user=RFeijKcAAAAJ`

Selected research projects

2019 – 2021	**BIGPROD: Addressing productivity paradox with big data: implications to policy making**	
	Funded by	H2020-SC6-TRANSFORMATIONS-2018-2019-2020
	Funding	994 t eur
	Role	Consortium leader & Principal investigator
2016 –2017	**IPLATE – Integrating platform competences toward network effects**	
	Funded by	the Finnish Funding Agency for Technology and Innovation
	Funding	320 t eur
	Role	Researcher
2015 – 2018	**SA_MST – Modeling S&T Systems Through Massive Data Collections**	
	Funded by	the Academy of Finland
	Funding	474 t eur
	Role	Principal Investigator
2015 –2016	**RAID – Radical and Incremental Innovation in Industrial Renewal**	
	Funded by	the Finnish Funding Agency for Technology and Innovation
	Funding	900 t eur
	Role	Researcher

Full list of contract research project participation is given as an Appendix

Research exchange

- 09/2016–03/2017 Georgia Institute of Technology, Science, Technology and Innovation Policy (STIP) program, GA, USA
- 09/2012–12/2012 Georgia Institute of Technology, Science, Technology and Innovation Policy (STIP) program, GA, USA

AWARDS AND AD HONOREM POSITIONS

Awards and merits

Academy of Finland Postdoctoral Researcher Grant 2015 – 2018
Personal development grant from the Academy of Finland for a project on Modeling S&T Systems Through Massive Data Collections
ASLA-Fulbright Research Grant for a Junior Scholar 2012 -2013
Research exchange for a research visit at Georgia Institute of Technology, School of Public Policy
Best Student Paper Award at the 21st IAMOT Conference
Sami Hyrynsalmi, Arho Suominen, Tuomas Mäkilä, Timo Knuutila, The Emerging Mobile Ecosystem: An Introductory Analysis of Android Market. IAMOT 2012 Proceedings 21st International Conference for the International Association of Management of Technology, Taiwan, Hsinchu, April 2012.
Turku Centre for Computer Science (TUCS), Graduate School
Accepted to the TUCS Graduate Program in 2010
National Defence University, Naval Academy 73. Naval Officer Course
Head of Class of the Officers basic studies in the Electronics subject
National Defence University, Naval Academy 73. Naval Officer Course
A. R. Saarmaa foundation scholarship for the best leader in the Electronics subject

Administrative appointments

1. Ministry of Economic Affairs and Employment, Technology policy coordination group, member, 2024 –
2. Ministry of Defence, MATINE Social sciences division, advisory board member, 2023 –

3. VTT Technical Research Centre of Finland, member of leadership team, 2020 – 2023
4. VTT Technical Research Centre of Finland, Project Manager, Leading Excellence Strategy program, 09/2017 – 09/2019
5. University of Turku, Department of Information Technology, member of department council 2010 – 2012
6. University of Turku, Faculty of Mathematics and Natural Sciences, member of faculty council 2011 – 2012

Associate Editor

- Technological Forecasting and Social Change, Elsevier

Journal reviewer

An up to date list is available via Publons profile[2]

1. Technological Forecasting and Social Change, Elsevier
2. Journal of the Association for Information Science and Technology, Wiley
3. International Journal of Innovation Management, Imperial College Press
4. R&D Management, Wiley
5. Scientometrics, Springer
6. Energy Research and Social Science, Elsevier
7. Technology Analysis and Strategic Management, Routledge
8. Foresight, Routledge
9. IEEE Software, IEEE
10. Plos One, Public Library of Science
11. Journal of Business Chemistry, Institute of Business Administration at the Department of Chemistry and Pharmacy Westfälische Wilhelms-University Mnster

Memberships of Scientific Advisory board

1. The Global Text-mining, Analysis, and Visualization Conference Series 2013 -

Research Proposal reviewer

1. European Commission, EIC Accelerator (SME Instrument), expert evaluator for grant applications (2020 call)
2. Chilean National Science and Technology Commission (CONICYT - Chile) – the FONDECYT Regular 2017 grants

Evaluator for the Title of Docent (Adjunct Professor)

1. Dr. Matti Minkkinen, Docent of Futures Studies, University of Turku. Finland
2. Dr. Jari Kaivo-oja, Docent of technology foresight research, knowledge management and basic research of the digital economy, University of Vaasa, Finland

TEACHING AND ACADEMIC SUPERVISING DUTIES

[2] https://publons.com/researcher/534432/arho-suominen/

Supervisory duties

Have supervised three doctoral dissertations and 18 Master's and Bachelor's degree theses from 2009 to 2014 during my time at the University of Turku. List of dissertations and theses are available at request.

Lecturer

I have lectured 12 different course on graduate or undergraduate level. The majority of the courses have been directed towards engineering courses and have related to product development, measuring technological change and data science. Most recent courses below and full list in appendix.

2018 – 2019 **Introduction to Data Science, Undergraduate level, Tampere University**
Objectives: The course serves as an introductory course to data science. No pre-requisite courses are needed, but the course requires programming-.
Content: Course focuses on what is data science. Basics of data acquisition, machine learning and visualization. The course requires the completion of an exercise work.

2014 – 2018 **Technology Management and Forecasting, Graduate level course, University of Turku**
Objectives: To understand processes such as innovation management, product concept development, new product development and project management and having the ability to apply the above skills in practical engineering work.
Content: Content focuses on product, process and business model innovation, measuring technological change with both qualitative and quantitative methods and implications of change in technologies.

2013 – **Basics of Product and Service Business (Finnish Tuote- ja palveluliiketoiminnan perusteet), Undergraduate level course, University of Turku**
Objectives: To give students the basic on product and service business.
Content: Core concepts and theories of Product and Service Business.

Invited talks

01/2020 **Tampere University**
Invited lecture on Data Analytics in the Emerging Technology Adoption and Use course

01/2020 **University of Jyväskylä, Executive MBA**
Invited talk on the long cycles of technological change

06/2019 **Manchester Institute of Innovation Research (MIOIR)**
Invited talk on Data analytics in quantitative foresight at professional development course on foresight

01/2019 **Tampere University**
Invited lecture on Data Analytics in the Global Information Systems Management course

01/2019 **National Defence University, Finland**
Invited lecture on Technological development

11/2018 **Lingsoft Oy development event, Turku, Finland**
Invited talk on Technological change

06/2018 **Manchester Institute of Innovation Research (MIOIR)**
Invited talk on Data analytics in quantitative foresight at professional development course on foresight

09/2017 **Pujiang Innovation Forum, Shanghai, China**
Panel discussion on immaterial property rights and technology transfer.

09/2017 **National Science Library, Chinese Academy of Sciences, Beijing, China**
Guest lecture on using data analytics and machine learning in technology analysis.

09/2016 **Bibliometrics, Citation Analysis and Tech Mining (PUBP 8803/4803), Georgia Institute of Technology, School of Public Policy**
Guest lecture on using machine learning methods in bibliometrics and technological forecasting.

11/2012 **Societal Change and Foresight Methods -course, Masters Degree Programme in Business Management and Entrepreneurship, HAMK University of Applied Science**
Guest lecture/interview on foresight methods

Appendix

Work in Progress

1. Schubert, T., Ashouri, S., Deschryvere, M., Jger, A., Visentin, F., Cunningham, S. W., ... & Suominen, A. (2023). The role of product digitization for productivityevidence from web-scraping European high-tech company websites.
2. Bck, A., Hajikhani, A., Jger, A., Schubert, T., & Suominen, A. (2022). Return of the Solow-paradox in AI?: AI-adoption and Firm Productivity. Centre for Innovation Research (CIRCLE), Lund University.

Publications

Peer-reviewed journal articles

1. Ashouri, S., Hajikhani, A., Hyytinen, A., Rouvinen, P., & Suominen, A. (2026). Which discoveries are paradigm shifting?. Industrial and Corporate Change, dtag002.
2. Paasi, J., Valkokari, K., & Suominen, A. (2026). Collaborative Foresight: Major Research Trajectories and Future Research Agenda. Futures, 103784.
3. Saari, U. A., Suominen, A., Rissanen, M., Tietze, F., & Salolainen, M. (2026). The Role of Patents in Circular Innovation: The Case of Sustainable and Recyclable Materials in the Textile Industry. Business Strategy and the Environment, 35(1), 967-1002.
4. Ashouri, S., Hajikhani, A., Suominen, A., Pukelis, L., & Cunningham, S. W. (2024). Measuring digitalization at scale using web scraped data. Technological Forecasting and Social Change, 207, 123618.
5. Suominen, A., & Deschryvere, M. (2024). Barriers to immaterial property rights development in research organizations: an explorative study from Finland. The Journal of Technology Transfer, 1-24.
6. Suominen, A., Deschryvere, M., & Narayan, R. (2023). Uncovering value through exploration of barriers-A perspective on intellectual property rights in a national innovation system. Technovation, 123, 102719.
7. Zhang, Y., Zhang, C., Mayr, P., & Suominen, A. (2022). An editorial of AI+ informetrics: multi-disciplinary interactions in the era of big data. Scientometrics, 127(11), 6503-6507.
8. Hajikhani, A., & Suominen, A. (2022). Mapping the sustainable development goals (SDGs) in science, technology and innovation: application of machine learning in SDG-oriented artefact detection. Scientometrics, 127(11), 6661-6693.
9. Suominen, A., & Pihlajamaa, M. (2022). Survey data on growth companies and control group's perceptions on innovative behavior. Data in Brief, 43, 108324.
10. Suominen, A., Hajikhani, A., Ahola, A., Kurogi, Y., & Urashima, K. (2022). A quantitative and qualitative approach on the evaluation of technological pathways: A comparative national-scale Delphi study. Futures, 140, 102967.
11. Ashouri, S., Suominen, A., Hajikhani, A., Pukelis, L., Schubert, T., Trkeli, S., ... & Cunningham, S. (2022). Indicators on firm level innovation activities from web scraped data. Data in brief, 42, 108246.
12. Hajikhani, A., Pukelis, L., Suominen, A., Ashouri, S., Schubert, T., Notten, A., & Cunningham, S. W. (2022). Connecting firm's web scraped textual content to body of science: Utilizing microsoft academic graph hierarchical topic modeling. MethodsX, 9, 101650.
13. Suominen, A., Kauppinen, H., & Hyytinen, K. (2021). Gold,Ribbon or Puzzle: What motivates researchers to work in Research and Technology Organizations. Technological Forecasting and Social Change, 170, , 120882.

14. Li, M., Porter, A. L., Suominen, A., Burmaoglu, S., & Carley, S. (2021). An exploratory perspective to measure the emergence degree for a specific technology based on the philosophy of swarm intelligence. Technological Forecasting and Social Change, 166, 120621.
15. Hajikhani, A., & Suominen, A. (2021). Dataset on researcher's mobility by utilising bibliometric data: Case of Finland-based scholars for the duration of 2008-2018. Data in Brief, 34, 106764.
16. Ranaei, S., Suominen, A., Porter, A., & Carley, S. (2020). Evaluating technological emergence using text analytics: two case technologies and three approaches. Scientometrics, 122(1), 215-247.
17. Suominen, A., Ranaei, S., & Dedehayir, O. (2019). Exploration of science and technology interaction: A case study on Taxol. IEEE Transactions on Engineering Management.
18. Suominen, A., Peng, H., & Ranaei, S. (2019). Examining the dynamics of an emerging research network using the case of triboelectric nanogenerators. Technological Forecasting and Social Change, 146, 820-830.
19. Suominen, A., Seppnen, M., & Dedehayir, O. (2019). A bibliometric review on innovation systems and ecosystems: a research agenda. European Journal of Innovation Management.
20. Li, M., Porter, A. L., & Suominen, A. (2018). Insights into relationships between disruptive technology/innovation and emerging technology: A bibliometric perspective. Technological Forecasting and Social Change, 129, 285-296.
21. Korhonen, H. M., Still, K., Seppnen, M., Kumpulainen, M., Suominen, A., & Valkokari, K. (2017). The core interaction of platforms: How startups connect users and producers. Technology Innovation Management Review, 7(9), 17-29.
22. Arho Suominen and Ozgur Dedehayir. Pathways to a drug: A mixed methods analysis of emergence. International Journal of Innovation Management 21.08 (2017): 1740011.
23. Arho Suominen, Hannes Toivanen and Marko Seppänen. Firms' knowledge profiles: Mapping patent data with unsupervised learning. Technological Forecasting and Social Change. 115 (2017): 131-142.
24. Arho Suominen, Yin Li, Jan Youtie ans Phil Shapira. A bibliometric analysis of the development of next generation active nanotechnologies. Journal of Nanoparticle Research. 2016, 18(9), 270.
25. Samira Ranaei, Matti Karvonen, Arho Suominen and Tuomo Kässi. Patent-based technology forecasting: case of electric and hydrogen vehicle. International Journal of Energy Technology and Policy. 2016, 12(1), 20-40.
26. Sami Hyrynsalmi, Arho Suominen and Matti Mäntymäki. The influence of developer multihoming on competition between software ecosystems. Journal of Systems and Software. 111, 2016, pp. 119–127
27. Arho Suominen and Hannes Toivanen. Map of science with topic modeling: Comparison of unsupervised learning and human–assigned subject classification. Journal of the Association for Information Science and Technology, 67.10 (2016): 2464-2476.
28. Hannes Toivanen and Arho Suominen. Epistemic Integration of ERA: The Shifting Geography of the Knowledge Base of Finnish Research 1995–2010. Science and Public Policy, 42 (4), 2015, pp. 549–566.
29. Sami Hyrynsalmi, Marko Seppänen, Leena Aarikka-Stenroos, Arho Suominen, Jonna Jarvelainen and Ville Harkke. Busting myths of electronic word of mouth: the relationship between customer ratings and the sales of mobile applications. Journal of theoretical and applied electronic commerce research, 10(2), 2014, pp. 1–18
30. Hannes Toivanen and Arho Suominen. The Global Inventor Gap: Distribution and Equality of World-Wide Inventive Effort, 19902010. PloS one. 10(4), 2015, e0122098
31. Chyi-Kwei Yau, Alan Porter, Nils Newman, Arho Suominen, Clustering scientic documents with topic modeling, Scientometrics, 100(3), 2014, pp. 767–786.
32. Sami Hyrynsalmi, Marko Seppänen and Arho Suominen, Sources of Value in Application Ecosystem, Journal of Systems and Software, 96, 2014, pp. 61–72.

33. Arho Suominen, Phases of growth in a green tech research network: A bibliometric evaluation of fuel cell technology from 1991 to 2010, Scientometrics, 100, pp 1–22.
34. Sami Hyrynsalmi, Arho Suominen, Tuomas Mäkilä, Timo Knuutila, The Emerging Mobile Ecosystems: an Introductory Analysis of the Android Ecosystem, International Journal of E-Business Research, 10(2), 2014, In press
35. Arho Suominen and Marko Seppänen. Bibliometric Data and Actual Development in Technology Life Cycles: Flaws in Assumptions, Foresight, foresight, 16(1), 2014, pp 37–53.
36. Sami Hyrynsalmi, Arho Suominen, Timo Knuutila, Young mobile users: radical and individual not, Telematics and Informatics, 31(2), 2014, pp. 266–281.
37. Jongyun Moon, Hannu-Pekka Hedman, Marianna Kemell, Arho Suominen, Ermei Mäkilä, Hong Kim, Aulis Tuominen, and Risto Punkkinen, Interference Colors of TiO2 Nanotube Arrays Grown by Anodic Oxidation, Advanced Materials Research, 875, 2014, pp. 370–374.
38. Jongyun Moon, Marianna Kemell, Byungki Park, Arho Suominen, Ermei Mäkilä, Risto Punkkinen, Hannu-Pekka Hedman, Hong Kim, Lippo V Lassila, and Aulis Tuominen, The correlation between the interference colour and growth procedure of anodic titanium dioxide nanotube arrays, Coloration Technology, 130(1), 2014, pp. 1–7.
39. Jongyun Moon, Risto Punkkinen, Hannu-Pekka Hedman, Marianna Kemell, Jarmo Kukkola, Arho Suominen, Ermei Mäkilä, Hong Kim, Aulis Tuominen, A study of monitoring hydrogen at room temperature using anodic TiO2 film synthesized on silicon, Sensors and Actuators B: Chemical, 189, 2013, pp. 246–250
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2. Suominen, A. (2025). New Ventures Framing the Future? Sensegiving in Food Tech. In XXXVI ISPIM Innovation Conference: Innovation Powered by Nature. International Society for Professional Innovation Management ISPIM.

3. Suominen, A., & Deschryvere, M. (2025). Geopolitical risk exposure of US stock-listed companies: Sectoral vulnerabilities and implications for strategic decision-making. In 2025 RD Management Conference-Innovation Biodiversity.
4. Rilla, T. N., Hmlinen, H., Nieminen, M., Suominen, A. (2024). Capabilities of RTOs in multi-faceted innovation. Co-creating sustainable solutions for Future-proof Societies: The European Association for REsearch on SERvices (RESER), 34th International RESER Conference: Conference proceedings.
5. Deschryvere, M., Schubert, T., Ashouri, S., Jger, A., Visentin, F., Cunningham, S. W., ... & Suominen, A. (2023). The role of product digitization for productivity: Evidence from web-scraping european high-tech company websites. In DRUID 2023.
6. Hajikhani, A., Cunningham, S., Pukelis, L., & Suominen, A. (2023). Measuring innovation and complexity in industry. In Academy of Management Proceedings (Vol. 2023, No. 1, p. 15893). Briarcliff Manor, NY 10510: Academy of Management.
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8. Arho Suominen, Arash Hajikhani, and Marko Seppänen. "Revisiting Technological Depths and Breadths Effects on Firm Performance: The Case of Pharmaceutical Industry." In ISPIM Conference Proceedings, pp. 1-16. The International Society for Professional Innovation Management (ISPIM), 2019.
9. Michelle Smidt , Ozgur Dedehayir, and Arho Suominen. "The Emergence of Entrepreneurial Ecosystems: A review of the Literature." In ISPIM Conference Proceedings, pp. 1-12. The International Society for Professional Innovation Management (ISPIM), 2019.
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13. Samira Ranaei and Arho Suominen. Using Machine Learning Approaches to Identify Emergence: Case of Vehicle Related Patent Data. Management of Engineering and Technology (PICMET), 2017 Portland International Conference on. Portland, OR, United States. July 2017.
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18. Arho Suominen. Topic modelling approach to knowledge depth and breadth: Analyzing trajectories of technological knowledge. International Conference of the IEEE Technology and Engineering Management Society (TEMSCON), IEEE. Santa Clara, USA. June 2017
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Book chapters

1. Samuel Kaski, Heikki Ailisto, Arho Suominen. International AI experts: Towards the third wave of artificial intelligence, in the eading the way into the age of artificial intelligence. Ministry of Economic Affairs and Employment, 2019
2. Samira Ranaei, Arho Suominen, Alan Porter, Tuomo Kässi. Application of text-analytics in quantitative study of science and technology: advancement, challenges and future directions, in the Springer Handbook of Science and Technology Indicators. Springer, 2019
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Non-refereed scientific articles

Conference presentation

1. Arho Suominen and Hannes Toivanen. Funding Thin Air: Research Collaboration and Geography of Excellence and Productivity in Finnish research 1995–2009, at the EU-SPRI New forms of collaboration in policy design, implementation and evaluation -conference, Madrid, Spain, 2013.
2. Arho Suominen. Analyzing metrics for tech mining methodologies, At the 1st Global Tech-Mining Conference, Atlanta, USA, 2011.

Poster presentations

1. Arho Suominen. Analyzing the impact of research policy with a ego network analysis, At the 2nd Global TechMining Conference, Montreal, Canada, 2012.

Scientific books (monographs)

Edited books

1. Arho Suominen, Hannes Toivanen & Mika Nieminen. The book of abstracts for The 2015 Annual Conference of the EU-SPRI Forum. Innovation policies for economic and social transitions Developing strategies for knowledge, practices and organizations. VTT, Espoo, 2015
2. Aulis Tuominen, Jussi Kantola, Arho Suominen % Sami Hyrynsalmi. NEXT 2008 - Proceedings of the Fifth International New Exploratory Technologies Conference, number 50 in General Publications. Turku Centre for Computer Science, 2008.

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2. Lehtinen, S., Saari, S., Suominen, A., Indukaev, A., & Eskonmaa, J. (2022). Russias technological policy and knowhow in a competitive global context. Prime Minister's Office.
3. Ali-Yrkk, J., Halme, K., Deschryvere, M., Lehenkari, J., Piirainen, K., & Suominen, A. (2021). The Prerequisites for Increasing the R&D Activity of Companies in Finland (No. 98). The Research Institute of the Finnish Economy.
4. Matthias Deschryvere, Kai Husso and Arho Suominen. Fostering R&D intensity in Finland-Policy experience and lessons learned: Country case study contribution to the OECD TIP project on R&D intensity. (2021). OECD.
5. Salminen, V., Halme, K., Kettinen, J., Hrml, V., Jrvelin, A. M., Suominen, A., ... & Stevenson, A. Aineettomien oikeuksien tilanne Suomessa 2020: IPR-strategian taustoitus. (2021). valtioneuvoston kanslia.
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7. Hannes Toivanen and Arho Suominen. Bibliometrinen tutkimustieto ja tiedepolitiikka, Tieteessä tapahtuu, 32(2), 2014
8. Toni Ahlqvist, John Kettle, Eemeli Hytönen, Klaus Niemel, Antti Kivimaa, Nafty Vanderhoek, Mikko Dufva, Arho Suominen, Henna Sundqvist, Tuula Mäkinen, and Esa Kurkela. Stage 2. Future options for the cellulosic fibre value chain in the Green Triangle, South Australia: strategic technology roadmaps, business cases and policy recommendations, Apeendices to the report. VTT, 2013.

Theses

1. Arho Suominen. Notes on emerging technologies, Dissertation, TUCS, 2011.
2. Arho Suominen. An Analysis of the Terminology in the Context of Productization. Lic thesis, Dec 2009.

Patents and invention disclosures

Patent application

1. Hannes Toivanen, and Arho Suominen. "Automated Analysis System and Method for Analyzing at Least One of Scientific, Technological and Business Information." U.S. Patent Application 15/868,850, filed July 11, 2019.
2. Hannes Toivanen, Arho Suominen. Automated Monitoring and Archiving System and Method. U.S. Patent Application No 15/212,103, 2018.
3. Aulis Tuominen, Arho Suominen Raimo Jokinen, Marjo Fonsell, Henrik Lagercrantz, Janne Mäkilä, Wukui Zheng. A method for manufacturing a passive direct methanol fuel cell and a passive direct methanol fuel cell. WO Application No 2013064726A1

Research projects

Funding as organization share / total consortium

2025 – 2028 **TRIM: Transforming Immigration Systems for Future Skills**
Funded by Academy of Finland
Funding 449t€/ 2990t€
Role Work package leader, VTT PI

2024 – 2026 **Future-Proofing Finlands Strategic Competitiveness and Innovation System Adapting to a new geopolitical era**
Funded by Business Finland
Funding 239t€/ 516t€
Role PI

2022 – 2024 **STRA4: Strategic foresight for Sustainable Innovation and Growth**
Funded by Business Finland
Funding 187t€/ 1701t€
Role WP leader, Tampere University PI

2021 – 2024 **CRIEG: Company Resilience in the Era of Globalization Resilience of firms to shocks and policy implications**
Funded by Business Finland
Funding 87t€/ 400t€
Role WP Leader, VTT PI

2021 – 2022 **Russian Technology Policy and Capabilities in Global Technology Competition**
Funded by Finnish Governments Research Activities
Funding 60t€/ 139t€
Role Consortium leader, VTT PI

2021 – 2021 **Europe Facing Great-Power Competition: Mapping Finlands Risks and Options in the Geoeconomic Rivalry**
Funded by Finnish Governments Research Activities
Funding 37t€/ 140t€
Role WP Leader, VTT PI

2019 – 2021 **BIGPROD: Addressing productivity paradox with big data: implications to policy making**
Funded by H2020-SC6-TRANSFORMATIONS-2018-2019-2020
Funding 250t eur / 994 t eur
Role Consortium leader, VTT PI

2020 –2020 **IPSTRA: Immaterial Property Rights Status in Finland 2020 Background study for Finlands IPR Strategy**
Funded by Finnish Governments Research Activities
Funding 60t€/ 139t€
Role WP Leader, VTT PI

2016 –2017 **IPLATE – Integrating platform competences toward network effects**
Funded by The Finnish Funding Agency for Technology and Innovation
Funding 320t€
Role Researcher

2015 – 2018 **SA_MST – Modeling S&T Systems Through Massive Data Collections**
Funded by The Academy of Finland
Funding 474t€
Role PI

2015 –2016 **RAID – Radical and Incremental Innovation in Industrial Renewal**
Funded by The Finnish Funding Agency for Technology and Innovation
Funding 900t€
Role Researcher

2013 – 2014 **SMARTIC - Arctic Vision and Roadmap**
Funded by Ministry for Environment and Building Industry Confederation RTT
Funding 500t€
Role Patent analysis

2013 – 2014 **FUTBEMS - Future Building Materials**

	Funded by	Ministry for Environment and Building Industry Confederation RTT
	Funding	100t€
	Role	Patent analysis
2013 – 2014	**CEK – Co-evolution of knowledge creation systems and innovation pipelines**	
	Funded by	The Finnish Funding Agency for Technology and Innovation
	Funding	867t€
	Role	Researcher
2011 – 2012	**RELED – Reliable LED Lighting**	
	Funded by	The Finnish Funding Agency for Technology and Innovation
	Role	Researcher
2010 – 2011	**Commercialization project for the findings of the PORTFUCELL project.**	
	Funded by	The Finnish Funding Agency for Technology and Innovation
	Role	Lead researcher
2007 – 2009	**PORTFUCELL – Portable Fuel Cell Research and Productization**	
	Funded by	The Finnish Funding Agency for Technology and Innovation
	Role	Research / Project Manager
2005 – 2007	**JOINUS – Electronics Manufacturing reliability with ROHS solders.**	
	Funded by	The Finnish Funding Agency for Technology and Innovation
	Role	Research Assistant

Contract research

2026	**Technology foresight project, topic undisclosed**	
	Acquired by	Defence sector company
	Partners	VTT
	Funding	170t€
	Role	PI
2026	**Technology standardization project, topic undisclosed**	
	Acquired by	Automotive sector company
	Partners	VTT
	Funding	50t€
	Role	PI
2024 – 2026	**System Dynamics for Assessing Impacts of R&I Policy**	
	Acquired by	European Commission (DG RTD)
	Partners	VTT, KU Leuven, IDEA Consult
	Funding	109t€/ 200t€
	Role	Consortium Leader, VTT PI
2025 – 2026	**Strategies for Research and Innovation in European Aviation**	
	Acquired by	European Commission (DG RTD)
	Partners	VTT, CSIL, IDEA Consult
	Funding	98t€/ 259t€
	Role	Work package leader, VTT PI
2024 – 2024	**Technology Policy 2024 Review**	
	Acquired by	Ministry of Economic Affairs and Employment of Finland
	Partners	VTT
	Funding	29t€
	Role	PI
2020	**Shift2Rail S2R JU Request for services High Level Position Paper...**	
	Acquired by	The European Commission DG Research & Development
	Partners	VTT, JIIP, & EY
	Funding	11t€/ NA
	Role	Work Package Leader
2020	**Organizations impact model development**	
	Acquired by	The Finnish State Development Company Ltd
	Partners	None
	Funding	11t€
	Role	PI
2020	**Organizations role in Innovation system**	
	Acquired by	The Finnish State Development Company Ltd

	Partners	None
	Funding	9000€
	Role	PI
2019	**A Study on Dual Use Materials – Addressing dual-use issues...**	
	Acquired by	the European Commission DG Research & Development
	Partners	VTT, JIIP, AIT, & SPI
	Funding	36t€/ NA
	Role	Work Package Leader, VTT PI
2019	**Teknologiatutka (Technology Radar)**	
	Acquired by	Hartwall Oy (a subsidiary of Royal Unibrew)
	Partners	None
	Funding	16t€
	Role	PI
2013	**SA Cellu South Australian Cellulosic Fibre Value Chain Technology Roadmap**	
	Acquired by	Department for Manufacturing, Innovation, Trade, Resources and Energy, Government of South Australia
	Role	Patent analysis
2013	**Evaluation – Impact of Tekes activities on Well-being and Environment**	
	Acquired by	the Finnish Funding Agency for Technology and Innovation
	Partners	Technopolis BV and VTT Technical Research Centre of Finland
	Role	Statistical analysis

Teaching and academic supervising duties

Dissertation supervisor

1. Sajad Ashouri. 2025. Developing Scalable and Adaptive Methodologies for Measuring Innovation. University of Tampere
2. Andi Mawazo Mwegerano. 2014. Managing Customer Issues through a Support Channel Network, University of Turku
3. Jarno Kankaanranta. 2012. Applications of Industrial Statistics, Dissertation, University of Turku.
4. Wukui Zheng. 2012. A Novel Structure of a Direct Methanol Fuel Cell: Design, Research and Assembly, Dissertation, University of Turku.

Graduate and undergraduate thesis supervisor

1. Riku Lehtilä. 2012. Puhallinmuuntajan valmistusprosessin analysointi Lean Six Sigma -menetelmän tykaluja käyttän (Analysis of Fan-Transformers Manufacturing Process with Lean Six Sigma Methodology and Tools, in Finnish), Master thesis, University of Turku
2. Mariliisa Virolainen. 2012. Palveluiden tuotteistaminen vakiintuneilla toimialoilla: tapaustutkimus energia-alalla (Service Productization in Established Industries: Case Study in Energy Industry, in Finnish), Master thesis, University of Turku
3. Anita Gajurel. 2012. Analyzing Mobile Phone Use: the Adoption of Technologies and Services by Young People, Master thesis, University of Turku
4. Markus Lithonius. 2012. Mobiilisovellusten kehittäjien ansaintamahdollisuudet digitaalisilla markkinapaikoilla (Business models of mobile application developers in digital marketplaces, in Finnish), Master thesis, University of Turku
5. Jesse Alho. 2012. Mobiiliekosysteemien yhteiset ohjelmistotuottajat (The multihoming application developers in mobile ecosystems, in Finnish), Bachelor thesis, University of Turku
6. Sagar Sapkota. 2012 . Smart Phone Based Context-Aware Application for Led Lighting, Master thesis, University of Turku
7. Kristian Salokoski. 2012. Using Modular Architecture and Product Configuration to Increase Effectiveness and Profitability in a Production Firm: A Case Study, Master thesis, University of Turku
8. Jarno Toivanen. 2012. Benefits of SAP Solution Manager in Project Management, Master thesis, University of Turku
9. Samu Vuorela. 2011. Characterizing the reliability of solid-state lighting electrical drivers, Master thesis, University of Turku
10. Riikka Savioja. 2011. Technology-push Product Development: A Case Study, Master thesis, University of Turku
11. Janne Mäkilä. 2010. Implementing Six Sigma into applied research of new technology, Master thesis, University of Turku
12. Jussi Oksanen. 2010. Screening the possibility to productize a self-powered heater from electrical and practical point of view, Master Thesis, University of Turku.
13. Janne Mäkilä. 2009. Suorametanolipolttokennon soveltuvuus kannettavien elektroniikkalaitteiden energialähteeksi (The suitability of Direct Methanol Fuel Cells to consumer electronics, in Finnish), Bachelor Thesis, University of Turku.
14. Henrik Lagercrantz. 2009. Tuotteistamisprosessin alkuvaiheen haasteiden kartoitus ja hallinta prosessitykalun avulla (Mapping and Managing Front End Challenges of the Productization Process with a Process Tool, in Finnish), Master thesis. University of Turku.
15. Jussi Oksanen. 2009. The possibilities of photovoltaics as distributed energy systems in Europe, Bachelor thesis, University of Turku.
16. Kristian Salokoski. 2009. Langattoman äänen- ja kuvansiirtoteknologian hydyntäminen kotiteatterijärjestelmässä (Cordless Audio and Video signal in home entertainment systems, in Finnish), Bachelor thesis, University of Turku.
17. Jarno Toivanen. 2009. Menetelmä passiivisen suorametanolipolttokennon valmistamiseksi (A method for manufacturing a passive Direct Methanol Fuel Cell, in Finnish), Bachelor thesis, University of Turku.

Master Thesis Inspector

1. Anne-Marie Touru. 2010. Suomalaisten ohjelmistoyritysten kansainvälistyminen Intian ja Kiinan markkinoille (The internalization of Finnish software companies to India and China, in Finnish), Master thesis, University of Turku.

Lecturer

2019 – **Introduction to Data Science, Undergraduate level, Tampere University**
Objectives: The course serves as an introductory course to data science. No pre-requisite courses are needed, but the course requires programming-.
Content: Course focuses on what is data science. Basics of data acquisition, machine learning and visualization. The course requires the completion of an exercise work.

2014 – 2019 **Technology Management and Forecasting, Graduate level course, University of Turku**
Objectives: To understand processes such as innovation management, product concept development, new product development and project management in product development and having the ability to apply the above skills in practical engineering work.
Content: Content focuses on product, process and business model innovation, measuring technological change with both qualitative and quantitative methods and implications of change in technologies.

2013 – 2019 **Basics of Product and Service Business (Finnish Tuote- ja palveluliiketoiminnan perusteet), Undergraduate level course, University of Turku**
Objectives: To give students the basic on product and service business.
Content: Core concepts and theories of Product and Service Business.

2013 **Humans and technological development (Finnish Ihminen teknologian kehityksessä), Graduate level course, University of Turku**
Objectives: The students should learn the basic product development theories and methods, and by focusing on examples from different industries.
Content: he basics of product development theories are then applied through examples to different contexts.

2013 **Innovation and product development in High-techn industries (Finnish Innovaatiot ja tuotteiden kehittminen teknologiateollisuudessa), Graduate level course, University of Turku**
Objectives: To understand the human side of engineering and its effects in product development. The course has two objectives; to understand the possibilities created through cross-disciplinary actions and to understand the human aspect external to the development team.
Content: Motivational theories and system theory in explaining our role as a developer and user of technology. Users role as a content creator and adopter of technology.

2010 – 2013 **Industrial Engineering (Finnish Teollisuustalous), Undergraduate level course, University of Turku**
Objectives: To give students the basic understanding on industrial engineering.
Content: Core concepts and theories of Industrial Engineering.

2010 – 2012 **Software Entrepreneurship, Graduate level course, University of Turku**
Objectives: To deepen the students knowledge in software business and software business-specific aspects of growth-oriented entrepreneurship familiarize the student with the central concepts of the strategic management.
Content: Business in the software industry; software entrepreneurship software business an innovative growth-oriented firms strategic management of software business.

2010 **Summer courses on Product Development, University of Turku**
Supervising teacher and lecturer in a 20 ECTS summer courses set on the Theoretical Background for New Product Development.

Continues...

2009 – 2012 **Introduction to Project Leadership, Graduate level course, University of Turku**
Objectives: The objective is to learn how to plan, define and manage relevant project issues. Students are taught the basics of the management and leadership aspects of project management. This includes the understanding of basic management tools and leadership theories.
Content: Basics on leadership theories and project management tools.

2008 – 2012 **Special Course in Productization, Graduate level course, University of Turku**
Objectives: To give students basic understanding on the context and theory of productization. Course will cover basic New Product Development processes and their evolution. Course will focus on processes such as Stage- Gate in giving students understanding on New Product Development processes. After the course student should be able to define productization in the context of New Product Development.
Content: New Product Development processes, innovation management and the theory and definition of productization.

2008 – 2012 **Project Case, Graduate level course, University of Turku**
Objectives: To utilize taught project management theories in a real project environment and to obtain experience from project work in practice. Working as a team and achieving targets together are also important lessons learnt during this course.
Content: Projects will be carried out by several team members with relevant skills and roles. Teams (supported by an experienced tutor) will agree and negotiate the project scope and deliverables with companies or institutes.

2008 – 2012 **Industrial Design, Graduate level course, University of Turku**
Objectives: To obtain basic level competence in the field of industrial design and its application in the context of new product development.
Content: Learning the significance of creating and developing concepts and specifications that optimize the function, value and appearance of products and systems for the mutual benefit of both user and manufacturer. Emphasis is on maintaining a practical concern for technical processes and requirements for manufacture; marketing opportunities and economic constraints; and distribution sales and servicing processes.

2008 – 2009 **Project Management, Graduate level course, University of Turku**

Lectures in continued education

01/2021 **Innovative Digital Services of the Future degree program, Laurea University of Applied Sciences**
Two three hour lectures on technological forecasting, theory and applications

12/2020 **Leading with data training** at Continuous Learning Services of Tampere University for Business Finland
Lecture on Data and Analytics, course feedbak 4,75/5

11/2020 **Data and Analytics in Business development course** at Continuous Learning Services of Tampere University
Lecture on Predictive Analytics, course feedback 4,33/5

08/2012 **Product Development study module (Tuotteistamisen koulutusmoduuli) for ELY Nokia Bridge program, Business and Innovation Development BID, University of Turku**
8 lecture days on product development for current and previous Nokia Oyj employees.

05/2012 **Product Development study module (Tuotteistamisen koulutusmoduuli) for ELY Nokia Bridge program, Business and Innovation Development BID, University of Turku**
8 lecture days on product development for current and previous Nokia Oyj employees.

2010 **Software Product Development program (Ohjelmistotuotannon johtamisen koulutusohjelma), Edutech, Tampere University of Technology**
Half a day lecture on the theory of productization

Course Assistant

2007 – 2008	**Project Evaluation, Graduate level course, University of Turku**
2007 – 2008	**Electronics Components and Materials, Undergraduate level course, University of Turku**
2007 – 2008	**Advanced project in Production Engineering of electronics, Graduate level course, University of Turku**
2007 – 2008	**Project Management, Graduate level course, University of Turku**