

## **Curriculum vitae of Tuukka Panula**

### **Personal details and the date of the CV**

- Panula Tuukka Juhani
- Male
- 31.1.2022

### **Date and place of birth, nationality, current residence**

- 14.7.1993 in Pori, Finland
- Finnish
- Läntinen Pitkätie 16 a A 11, 20100 Turku, Finland

### **Education and degrees awarded**

- MSc. (Tech.) University of Turku, Finland, 2019
  - Major: Medical Analytics and Health IoT (grade: 5)
  - Thesis: Design and Implementation of a Wearable Sensor Node for Monitoring Mechanocardiographic Phenomena(grade: 5)
  - Graduation date: 20.6.2019
- BSc. (Tech.) University of Turku, Finland, 2018
  - Major: Computer Engineering

### **Other education and training, qualifications and skills**

- MOOC course: Machine Learning, Stanford University. Issued May 2019. Credential ID: 9KL6ME6AEYGB

### **Linguistic skills**

- Finnish, native
- English, fluent
- Swedish, intermediate
- German, beginner
- Chinese, beginner

### **Current position**

- Doctoral student, Department of Computing, Health technology laboratory, University of Turku, Finland
  - Jan 2020 -
  - Working on medical analytics and instrumentation. Currently researching new blood pressure monitoring methods (project funded by Business Finland, 2018-2021) and wearable cardiovascular diagnostics (project funded by Business Finland, 2020-2022). My work involves some course assistant work and thesis supervision.

## **Previous work experience**

- Project researcher, Department of Future Technologies, University of Turku, Finland
  - Jul 2019 - Dec 2019
  - Medical embedded systems design and course assistant work
- Research assistant, Department of Future Technologies, University of Turku, Finland
  - Sep 2017 - Jun 2019
  - Medical embedded systems design and course assistant work
- Trainee, Department of Information Technology, University of Turku, Finland
  - Jun 2017 - Aug 2017
  - Embedded system development in a medical sensor system project
- Trainee, LG Electronics Finland Lab Oy, Finland
  - May 2016 - Sep 2016
  - I worked as a trainee for 4 months in 2016 at LG Electronics Finland Lab's digital design team. My job consisted mostly of Design for Testability verification in a 5G radio SoC as well as test bench design.
- Trainee, Department of Information Technology, University of Turku, Finland
  - May 2015 - Sep 2015
  - During the summer of 2015 I worked as a trainee at the laboratory of microelectronics at the Department of Information Technology. My job was to conduct various measurements and analysis on semiconductors using eg. LabVIEW. The traineeship included work in a clean room environment.

## **Merits in teaching and pedagogical competence**

- Course assistant work
  - Analytics and Programming of Health Wearables (advanced studies)
    - 2020 & 2021
    - Created and counseled the lab exercises
  - Embedded IoT Programming (advanced studies)
    - 2017 & 2019
    - Created and counseled the lab exercises
  - Medical Instrumentation (advanced studies)
    - 2018 & 2019 & 2021
    - Created and counseled the lab exercises
- Thesis co-supervision
  - Sari Kivelä, MSc. (Tech) thesis, "Quality Control Software for a Gamma Spectrometer", Jun 2020
  - Jukka-Pekka Sirkiä, MSc. (Tech) thesis, "Multi-Wavelength Photoplethysmography Device for Measuring Cardiovascular and Haemodynamic Parameters : Design and Implementation", Sep 2020

## **Research funding and grants**

- Business Finland research-to-business project “STOP-HF: a solution for monitoring jugular venous pulse for cardiopulmonary diagnostics” 2020-2022, 799 535€
- The Finnish Foundation for Technology Promotion grant 2021, 5000€
- Emil Aaltonen foundation support grant 2020, 5000€
- University of Turku Graduate School (UTUGS) funded doctoral candidate position, 2020-2023

## Research output

- Total number of publications: 12 (1 granted patent and 2 patent applications)
- List of publications
  - T. Panula, J. Sirkiä, D. Wong et al., “Advances in non-invasive blood pressure measurement techniques” in *IEEE Reviews in Biomedical Engineering*, Jan 2022 (review article, JuFo 1)
  - T. Panula, J. Sirkiä, M. Kaisti et al., “Control Method for Continuous Non-Invasive Arterial Pressure Monitoring using the Non-Pulsatile Component of the PPG Signal” in *CINC 2019*, Sep 2021 (conference article, JuFo 1)
  - T. Panula, J. Sirkiä, M. Kaisti et al., “Miniaturization of a Finger-Worn Blood Pressure Instrument” in *EMBC*, Nov 2021 (conference article, JuFo 1)
  - T. Panula, T. Koivisto, M. Pänkäälä et al., “An instrument for measuring blood pressure and assessing cardiovascular health from the fingertip” in *Biosensors and Bioelectronics*, vol. 167, Nov 2020 (journal article, JuFo 2)
  - J. Sirkiä, T. Panula, M. Kaisti et al., "Multi-Wavelength Photoplethysmography Device for the Measurement of Pulse Transit Time in the Skin Microvasculature" in *CINC 2019*, Sep 2020 (conference article, JuFo 1)
  - J. Sirkiä, T. Panula, M. Kaisti et al., “The Effects of External Pressure on Multi-Wavelength Photoplethysmography Signals” in *CINC 2019*, Sep 2021 (conference article, JuFo 1)
  - T. Panula, J. Blomster, M. Pänkäälä et al., "An Automated Device for Recording Peripheral Arterial Waveform" in *CINC 2019*, Sep 2019 (conference article, JuFo 1)
  - M. Kaisti, T. Panula, J. Leppänen et al., "Clinical assessment of a non-invasive wearable MEMS pressure sensor array for monitoring of arterial pulse waveform, heart rate and detection of atrial fibrillation" in *npj Digital Medicine*, vol. 2, no. 39, May 2019 (journal article, JuFo 1)
  - T. Panula, T. Hurnanen, J. Tuominen et al., "A Wearable Sensor Node for Detecting Atrial Fibrillation Using Real-Time Digital Signal Processing" in *ICECS 2018*, Dec 2018 (conference article)
- Granted patents:

- T. Panula, M. Kaisti, M. Pänkäälä, T. Koivisto, "An apparatus for measuring functionality of an arterial system", FI 128751 B, University of Turku, Date of Grant 30.11.2020
- Pending patent applications:
  - T. Panula, M. Kaisti, M. Pänkäälä, T. Koivisto, "An apparatus and a method for measuring jugular vein pressure waveform", Finnish Patent Application NO. 20206195, University of Turku, Nov 2020
  - J. Sirkiä, T. Panula, M. Kaisti, "An apparatus and a method for measuring compliance of blood vessels", Finnish Patent Application NO. FP300150FI, Feb 2021

### **Awards and honors**

- Honorary award for MSc. thesis (2018-2019), The Finnish Society for Computer Science, 500€ price

### **Other**

- Presentations at international scientific conferences
  - Annual International Conference of the IEEE Engineering in Medicine and Biology Society 2021 (remote, 1.-5.11.2021), oral presentation
  - Computing in Cardiology 2021 in Brno, Czech Republic (12.-15.9.2021), poster presentation
  - Computing in Cardiology 2019 in Singapore (8.-11.9.2019), poster presentation
  - International Conference on Electronics Circuits and Systems 2018 in Bordeaux, France (9.-12.12.2018), poster presentation