Curriculum vitae di *nome_socio*

Sottosettori ERC primari: **PE7_7** Signal processing
Eventuali sottosettori ERC secondari: **PE7_2** Electrical Engineering: Power

PERSONAL DETAILS

Family name, First name: Petri Dario
Birthdate: April 18, 1957
Researcher unique identifier (ORCID): 0000-0002-9739-4469
URL for web site: https://webapps.unitn.it/du/en/Persona/PER0004648/Curriculum

- **Education and key qualifications**

March 1990 PhD degree
Department of Electronics and Information Engineering, University of Padua, Italy
Advisor: Prof. Carlo Offelli
March 1986 Master degree
Department of Electronics and Information Engineering, University of Padua, Italy

- **Current position**

2012 - Full Professor of electronic instrumentation
Department of Industrial Engineering, University of Trento, Italy

- **Previous positions**

2002 – 2012 Full Professor of electronic instrumentation
Department of Information Science and Engineering, University of Trento, Italy
1999 – 2002 Full Professor of electronic instrumentation
Department of Electronics and Information Engineering, University of Perugia, Italy
1992 – 1999 Associate Professor of electronic instrumentation
Department of Electronics and Information Engineering, University of Perugia, Italy
1990 – 1992 Researcher in electronic instrumentation
Department of Electronics and Information Engineering, University of Padua, Italy

RESEARCH ACHIEVEMENTS AND PEER RECOGNITION

Research achievements

The listed research products have been selected by emphasizing the more recent and/or the most highly cited achievements. The products are sorted by field of research and in descending order of date.

Selected contributions in the field of power systems

"Multi-objective battery sizing optimisation for renewable energy communities with distribution-level constraints: A prosumer-driven perspective," Secchi, M., Barchi, G., Macii, D., Moser, D., **Petri, D.**, Applied Energy, vol. 297, Sept 2021, article n. 117171. This paper proposes a novel algorithm for the optimization of battery sizing employable in renewable energy communities. The candidate was the group leader (citations: Google scholar 33, Scopus 24, ISI WoS 20).

"Rapid Voltage Change Detection: Limits of the IEC Standard Approach and Possible Solutions," Macii, D., **Petri, D.**, IEEE Trans. on I&M, vol.69 no. 2, Feb 2020, pp. 382-392. The paper analyzes the performance limits of the RVC detection algorithm described in the IEC Standard 61000-4-3:2015 and it proposes an alternative very simple, but more accurate approach (citations: Google scholar 21, Scopus 17, ISI WoS 15).

"On the accuracy of phasor angle measurements in power networks," Barchi, G., Fontanelli, D., Macii, D., **Petri, D.**, , IEEE Trans. on I&M, vol.64 no. 5, May 2015, pp. 1129-1139. This paper analyzes the accuracy limits in the estimation of phasor angle, a crucial parameter for management of power networks. The candidate had the idea and he was the group leader (citations: Google scholar 39, Scopus 36, ISI WoS 34).

"A frequency-domain algorithm for dynamic synchrophasor and frequency estimation," **Petri, D.**, Fontanelli, D., Macii, D., IEEE Trans. on I&M, vol.63 no. 10, Oct 2014, pp. 2330-2340. In this paper a new DFT-based algorithm is proposed for the estimation of dynamic synchrophasor. The candidate had the idea of the new estimator. He was also the principal investigator and the group leader (citations: Google scholar 125, Scopus 112, ISI WoS 93).

"Accuracy analysis of the multicycle synchrophasor estimator provided by the interpolated DFT algorithm," Belega, D., **Petri, D.**, IEEE Trans. on I&M, vol.62 no. 5, May 2013, pp. 942-953. This paper proposes a rational use of DFT-based synchrophasor estimators and deeply analyzes their accuracy in dynamic conditions. The candidate was the principal investigator and the group leader (citations: Google scholar 188, Scopus 170, ISI WoS 147).

"Accuracy analysis and enhancement of DFT-based synchrophasor estimators in off-nominal conditions," Macii, D., **Petri, D.**, Zorat A, IEEE Trans. on I&M, vol.61 no. 10, Oct 2012, pp. 2653-2664. In this paper the Interpolated DFT algorithm is proposed for synchrophasor estimators discussing advantages and limitations. The candidate had the idea of the new estimator and he acted as the group leader (citations: Google scholar 161, Scopus 125, ISI WoS 104).

Selected contributions in the field of spectral analysis

"Fast procedures for accurate parameter estimation of sine-waves affected by noise and harmonic distortion," Belega, D., **Petri, D.** , Digital Signal Processing, vol. 114, 103035 , 2021. The paper proposes two real-time algorithms for parameter estimation of sine-waves embedded in noise and harmonics. It is shown that, despite their low processing complexity, the algorithms almost attain the asymptotic Cramér-Rao Lower Bound for unbiased estimators even if only about 1.5 cycles are observed. The candidate had the original idea and he was the group leader (citations: Google scholar 31, Scopus 21, ISI WoS 16).

"Impact of harmonics on the interpolated DFT frequency estimator", Belega, D., **Petri, D.**, Dallet, D., Mechanical Systems and Signal Processing, vol.66-67, 2016, pp. 349-360. In this paper the impact of harmonics on the estimates returned by an Interpolated DFT algorithm is analyzed. The candidate was the group leader (citations: Google scholar 25, Scopus 24, ISI WoS 19).

"Accuracy of sine wave frequency estimation by multipoint interpolated DFT approach," Belega, D., Dallet, D., **Petri, D.**, IEEE Trans. on I&M, vol.59 no. 11, Nov 2010, pp. 2008-2815. In this paper the accuracy of Interpolated DFT algorithm is analyzed and processing techniques for its improvement are proposed. The candidate was the group leader (citations: Google scholar 115, Scopus 94, ISI WoS 74).

"The Influence of Windowing on the Accuracy of Multifrequency Signal Parameter Estimation", Offelli, C., **Petri, D.**, IEEE Trans. on I&M, vol. 41 no.2, Apr. 1992 pp. 256-261. This paper propose many improvements with respect to the state-of-the art based on the analysis of the effect of noise on frequency-domain signal parameter estimation (citations: Google scholar 213, Scopus 176, ISI WoS 135).

"Interpolation Techniques for Real-Time Multifrequency Waveform Analysis", Offelli, C., **Petri, D.**, Trans. on I&M, vol. 39, n.1, Feb. 1990. This paper analyzes the effect of various algorithm parameters on the accuracy of the results provided by widely used frequency-domain multisine signal estimation methods. The candidate was the principal investigator (citations: Google Scholar 235, Scopus 167, ISI WoS 130).

Selected contributions in the field of localization

"Accuracy of RSS-Based Centroid Localization Algorithms in an Indoor Environment", Pivato, P., Palopoli, L., **Petri, D.**, IEEE Trans. on I&M, vol.60 , n.10, Oct 2011 , pag. 3451 - 3460. In this paper an accuracy enhancement of relevant state-of-the-art algorithms for indoor localization is proposed. The enhanced algorithms are applied to experimental data. The candidate was the principal investigator and the group leader (citations: Google Scholar 228, Scopus 169, ISI WoS 139)

"Digital time-of-flight measurement for ultrasonic sensors", Marioli, D, Narduzzi, C, Offelli, C., **Petri, D**., Sardini, E., Taroni, A, Trans. on I&M, vol. 41, n.1, Jan 1992. This paper proposes a digital algorithm for ultrasonic pulse-echo measurements, based on the use of a cross-correlation function to determine the time-of-flight. The candidate was the principal investigator (citations: Google Scholar 445, Scopus 292, ISI WoS 203).

Selected contributions in the field of A/D conversion

"Frequency domain testing of waveform digitizers", **Petri,D.**, IEEE Trans. Instrum. Meas., vol.IM-51, no.3, 2002. pp.445-453, In this paper a new DFT-based algorithm for real-time testing of waveform digitizers is proposed and the related sources of uncertainty are discussed (citations: Google Scholar 51, Scopus 44, ISI WoS 31).

"A/D Converter Performance Analysis by a Frequency Domain Approach", Benetazzo,L, Narduzzi,C, Offelli,C., **Petri,D**., IEEE Trans. Instrum. Meas., vol.IM-41, no.6, , Dec. 1992, pp.834-839. The method proposed in this paper is advised in the IEEE Standard 1057 for Digitizing Waveform Recorders. The candidate was the principal investigator (citations: Google Scholar 83, Scopus 55, ISI WoS 39).

Selected contributions in the field of measurement fundamentals

"Tri-Objective Optimal PMU Placement including Accurate State Estimation: The Case of Distribution Systems," Andreoni, R., Macii, D., Brunelli, M., **Petri, D.**, IEEE Access, pp. 62102-62117, 2021, article n. 9410219. This paper presents a novel algorithm that exploits fundamentals concepts of measurement science for the optimization of PMU placement in power networks. The candidate was the group leader (citations: Google scholar 33, Scopus 24, ISI WoS 19).

"Big data, dataism and measurement," **Petri, D.**, IEEE I&M Magazine vol.23 n.3, 2020, pp. 32-34. In the era of big data, the paper argues that principles, methodologies and techniques of measurement science are crucial to ensure proper and effective collection and use of data (citations: Google Scholar 18, Scopus 16, ISI WoS 12)

"A structural interpretation of measurement and some related epistemological issues," Mari, L., Carbone, P., Giordani, A., **Petri, D.**, Studies in History and Philosophy of Science Part A, vol. 65-66, 2017, pp. 46-56. The paper proposes a structural characterization of measurement, as partly empirical and partly conceptual process, by showing that the reliability of measurement results is guaranteed by the specific process structure. The candidate had some novel ideas presented in the paper and he was the group leader (citations: Google scholar 37, Scopus 22, ISI WoS 22).

"Measurement fundamentals: A pragmatic view," Mari, L., Carbone, P., **Petri, D.**, IEEE Trans. on I&M, vol.61 no. 5, May 2012, pp. 2107-2115. This paper discusses some aspects of the crucial question about which evaluation processes can be considered measurements and it proposes a pragmatic characterization of the concept rather than formal conditions. The candidate had the ideas on which the paper content is grounded and he was the group leader (citations: Google scholar 66, Scopus 45, ISI WoS 44).

"Low-power and low-cost implementation of SVMs for smart sensors," Boni, A., Pianegiani, F., **Petri, D.**, IEEE Trans. on I&M, vol.56 no. 1, Jan 2007, pp. 39-44. In this paper basic concepts of measurement science are applied to the optimization of the learning phase of support vector machines (citations: Google scholar 62, Scopus 38, ISI WoS 32).

Peer recognition

IEEE Joseph F. Keithley Award "For contributions to measurement fundamentals and signal processing techniques in instrumentation and measurement," 2020

IEEE Fellowship, 2009

Distinguished Associate Editor of IEEE Trans. on Instr. and Meas., 2011-2019

IEEE Instr. and Meas. Society Distinguished Service Award, 2017

ADDITIONAL INFORMATION

Other contributions to the research community

2019 – present: Associate Editor in Chief of the IEEE Trans. on Instrumentation and Measurement
2012 – 2014: Chair of the IEEE Italy Section
2015 – 2017: Member of the Italian Group of Expert of Evaluation (GEV) for research in the area of Industrial and Information Engineering
2014 – 2015: Member of the Committee for the National Scientific Qualification (ASN) of researchers in the scientific sector Measurement (settore concorsuale 09/E4)
2013 – 2016: President of the Italian Association on Electrical and Electronics Measurement (Gruppo Misure Elettriche ed Elettroniche)

2015 – 2018: Vice-President for Finance of the IEEE Instr. and Meas. Society
2012 – 2013: Vice-President for Conferenecs of the IEEE Instr. and Meas. Society
2015 – 2018: Chair IEEE IEEE Instr. and Meas. Society Fellow Coordination Committee
2014 – present: Chair IEEE Smart Cities Initiative in Trento, Italy
2014 – 2016: Founder and Co-chair of the IEEE Italy School of career boosting
2008 – 2010: Co-founder and Co-chair of the IEEE International Measurement University
2007 – 2019: Associate Editor (AE) of the IEEE Trans. on Instr. and Meas.

- Co-founder, Co-General Chair and/or Technical Program Co-Chair for various international IEEE Conferences
- Leading scientist of various projects funded by National and International research agencies
- Guest Editor of various Special issues and Special sections on world level scientific journals such as IEEE Trans. on Instr. and Meas., IEEE Instr. and Meas. magazine, International Journal on Computer Stand. Interf.

Career breaks, diverse career paths and major life events

2015 – present: President of the Quality Assurance Committee of the University of Trento, Italy.
2015 – 2021: Head of the Department of Industrial Engineering (DII), University of Trento, Italy. DII was selected as Department of Excellence in engineering research in 2017 and in 2022.
2010 – 2012: Head of the Department of Information Science and Engineering, University of Trento, Italy.
2007 – 2010: Chair of the ICT undergraduate and graduate study programs, University of Trento, Italy.
2002 – 2008: Chair of the ICT Ph.D. School, , University of Trento, Italy.
1999 – 2002: Chair of the ICT undergraduate and graduate study programs, University of Perugia.

- Co-founder of the Italian branch of the French firm DeltaMu, which operates in the area of industrial metrology.
- Co-founder of the start-up TRETEC, Trento, Italy, which deals with custom embedded system design.