

2021 Annual Report (May 2020 – May 2021) CNN-MAC Technical Committee IEEE Circuits and Systems Society

Chairman: Alon Ascoli
Past Chair: Fernando Corinto
Secretary: Andras Horvath

1. Technical Committee (TC) Meeting(s):

(Please state the number of TC meetings in the past year, where held, TC meeting attendance rate, and was a quorum present.)

The CNNAC Technical Committee in the IEEE Circuits and Systems Society organizes an annual TC meeting, at ISCAS, and a biannual TC meeting at CNNA.

Details on our TC meetings over the past years are available at

<https://iee-cas.org/community/technical-committees/cellular-nanoscale-networks-and-memristor-array-computing-technical-committee-cnn-mac>

Through an extraordinary meeting, held online on 2021 March the 9th, the TC voted for the approval of an historic amendment, originally proposed by R. Teztlaff and A. Ascoli, and fully supported by L. Chua, to change the name of the TC from into *Cellular Nonlinear Networks and Memristor Array Computing* (CNNAC) into *Cellular Nonlinear Networks and Memristor Array Computing* (CNN-MAC). More than half of the TC members voted in favor of the name change. The CASS has later approved the amendment. An ad hoc pair of documents, specifically a by-law and a charter, were then written down by the Chair A. Ascoli, with the support of the Secretary A. Horvath. The TC members were then asked to read the two documents and approve or reject them through an additional on-line voting procedure. Again, more than half of the TC members voted for the approval of the two documents. These two documents are available in the aforementioned website link. Importantly, and in summary, the scope of the research activities of the newly-born CNN-MAC TC shall enclose all the topics of the CNNAC-TC, but shall additionally stretch out to include *memristor array computing*.

2. Members, who submitted the annual report:

First Name	Last Name	Affiliation	Email	IEEE Grade	IEEE region
Alon	Ascoli	Technical University of Dresden	alon.ascoli@tu-dresden.de	Member	8
Mustak Erhan	Yalcin	Istanbul Technical University	mustak.yalcin@itu.edu.tr	Senior	8
Mauro	Forti	University of Siena Italy	forti@diism.unisi.it	Senior	8
Alberto	Tesi	University of Florence, Italy	alberto.tesi@unifi.it	Member	8
Mauro	Di Marco	University of Siena Italy	dimarco@diism.unisi.it	Senior	8
Péter	Szolgay	Peter Pazmany Catholic University, Budapest	szolgay@itk.ppke.hu	Senior	8
Zoltán	Nagy	Peter Pazmany Catholic University, Budapest	nagy.zoltan@itk.ppke.hu	Member	8
András	Horváth	Peter Pazmany Catholic University, Budapest	andras.horvath@itk.ppke.hu	Member	8
Angela	Slavova	Bulgarian Academy of Sciences	slavova@math.bas.bg	Senior	8
Valeri	Mladenov	Technical University, Sofia	valerim@tu-sofia.bg	Senior	8

Chai	Wah Wu	IBM T. J. Watson Research Center	chaiwahwu@ieee.org	Fellow	1
Ricardo	Carmona Galán	Instituto de Microelectrónica de Sevilla (CSIC- University of Seville)	ricardo.carmona@csic.es	Senior Member	R8

3. Accomplished Technical Activities

3.1. IEEE Conference/Event organizations

(Please highlight conference/events are technically and financially co-sponsored by the CAS Society)

Name	Conference Sponsor	Conference/Event Title	Role
Valeri Mladenov	IEEE	MOCAS - International Conference on Modern Circuits and Systems Technologies	Pc member
Peter Szolgay	IEEE	ICEMES - INTERNATIONAL CONFERENCE ON ENGINEERING OF MODERN ELECTRIC SYSTEMS	Technical Prog. Com member
Angela Slavova		NTADES - New Trends in the Applications of Differential Equations in Sciences	Program Chair
Angela Slavova		ECCTD- European Conference on Circuit Theory and Design	Conference Chair
Ricardo Carmona	IEEE CAS	International Symposium on Circuits and Systems	Technical Program Committee Chair
Ricardo Carmona	H2020-MSCA	Workshop on the Architecture of Smart Cameras	Organizer

Alon Ascoli	IEEE CAS	IEEE ISCAS 2021	Track Chair, and Special Session Organizer
Alon Ascoli	IEEE CAS	IEEE International Workshop on Cellular Nanoscale Networks and their Applications (CNNA 2021)	Program Chair for the Memristor and Memristive Symposium, and Special Session Organizer
Alon Ascoli	IEEE CAS	IEEE International Conference on Modern Circuits and Systems Technologies on Electronics and Communications (MOCAST 2021)	Special Session Organizer

3.2. IEEE Journal Editorships:

(Please highlight the journals that are (co-)sponsored by the CAS Society)

Name	Journal Sponsor	Journal Title	Role
Angela Slavova		International Journal of Neural Networks and Applications	Editor in chief
Mustak Yalcin	IEEE	Trans. on Circuits and Systems –II	Associate Editor
Mauro Forti	IEEE	Transactions on Cybernetics	Associate editor
Mauro Forti		Neural Networks (Elsevier)	Associate editor
Mauro Forti		Frontiers in Neuroscience	Associate editor
Mauro DiMarco		Neural Processing Letters (Springer)	Associate Editor

Péter Szolgay		Int. Journal of Circuit Theory and Applications, Wiley	Associate Editor
Ricardo Carmona	Springer	Journal on Real-Time Image Processing	Associate Editor
Ricardo Carmona	MDPI	Sensors	Guest Editor

3.3. Awards, Honors, and Recognition

(Fellow, Distinguished Lecturer, Outstanding Service, Best Paper Awards, and so on by the CAS Society)

Your Name	Awards / Honors / Recognition	Period
Ricardo Carmona	HiPEAC Tech Transfer Award	2020
Alon Ascoli	Best Paper Award at MOCAS 2020	Sept. 2020

3.4. Keynote Speeches/Invited Talks:

Your Name	Invited by	Event/Conference Title	Title	Talk Date
Chai Wah Wu	Ángel Rodríguez-Vázquez, Manuel Delgado-Restituto and Eduard Alarcón	ISCAS 2020	Simplifying Deep Neural Networks via Look-up Tables and Product of Sums Matrix Factorizations	17 October 2020
Alon Ascoli	G. Sirakoulis	Seminar at Democritus University of Thrace, Xanthi, Greece	Nonlinear System-Theoretic Concepts for Bio-Inspired Circuit Design	28 April 2020
Alon Ascoli	R.S. Williams	Seminar at Texas A&M, College Station, Texas, USA	A Truly-Systematic Technique For Mem-Computing Cellular Array Design	22 May 2020

3.5. Other distinguished IEEE services

(For example, CAS BoG, Region/chapter leadership, TC chairs/secretary)

Your Name	Organization	Position/Activities	Period
Chai Wah Wu	CASS	DLP selection committee	2021-2022
Ricardo Carmona	SSTC	Secretary	2019-2021
Alon Ascoli	IEEE CNNAC (now IEEE CNN-MAC) TC	Chair	2019-2021

4. TC Significant Technical Leadership and Innovations

Your Name	Organization	Technical Leadership/Innovation
Alon Ascoli	TU Dresden	Co-organizer of the special session on "" at ISCAS 2021
Alon Ascoli	TU Dresden	Co-organizer of the workshop on "Emergent Memristive Devices, Circuits and Systems for Wave Computing" at MOCAS 2021
Alon Ascoli	TU Dresden	Program chair for the Memristor and Memristive Symposium at CNNA 2021
Alon Ascoli	TU Dresden	Co-organizer of the "Memristor and Memristive Symposium Special Session" at CNNA 2021
Ronald Tetzlaff, Alon Ascoli	TU Dresden	With the support of L. Chua, R. Tetzlaff and A. Ascoli worked actively for the inclusion of <i>memristor array computing</i> within the scope of the scientific research activities of our TC. With the consent of the members, they also proposed the change of the TC name from Cellular Nonlinear Networks and Array Computing (CNNAC) into Cellular Nonlinear Networks and Memristor Array Computing (CNN-MAC). The proposal has been accepted by the TC and approved by the IEEE CASS leadership. A. Ascoli has already received much interest from established memristor researchers, including R. Waser, S. Kvatinsky, J.J. Yang, and Q. Fei, to join the newly-born TC. Their entry into the TC will be voted during the incoming ISCAS 2021 annual meeting.

Publications:

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4. Goncu E. and Yalcin M.E., "A Design of Cellular Automata based PUF and Its Implementation on FPGA" *International Journal of Circuit Theory and Applications*, 2020, doi:10.1002/cta.2792.
5. Bouridah M. S., Bouden T. and Yalcin M.E., "Chaos synchronization of fractional-order Lur'e systems," *International Journal of Bifurcation and Chaos*, International Journal of Bifurcation and Chaos, 2020
6. Fernando Corinto, Mauro Forti, Leon Chua, *Nonlinear Circuits and Systems with Memristors*, Springer, 2021. ISBN 978-3-030-55650-1.
7. G. Innocenti, M. Di Marco, A. Tesi, M. Forti, "Input-output characterization of the dynamical properties of circuits with a memelement", *International Journal of Bifurcations and Chaos*, Vol. 30, 7, (2020) 2050110 (32 pages), DOI:10.1142/S0218127420501102.
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9. M. D. Marco, M. Forti, F. Corinto and L. Chua, "Unfolding Nonlinear Dynamics in Analogue Systems With Mem-Elements," in *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 68, no. 1, pp. 14-24, Jan. 2021, doi: 10.1109/TCSI.2020.3024248
10. M. Di Marco, M. Forti, G. Innocenti and A. Tesi, "Input design for controlling dynamics in a second-order memristive circuit," 2020 *European Conference on Circuit Theory and Design (ECCTD)*, Sofia, Bulgaria, 2020, pp. 1-4, doi: 10.1109/ECCTD49232.2020.9218368
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