Please cite the Published Version

The Role of the WCI Community in the IEEE CIM: An Activity Report

Vesna Šešum-Čavić
Chair of the IEEE WCI Subcommittee, Technische Universität Wien, AUSTRIA

Keeley Crockett
Vice-chair of the IEEE WCI Subcommittee, Manchester Metropolitan University, UK

Sansanee Auephanwiriyakul
Vice-chair of the IEEE WCI Subcommittee, Chiang Mai University, THAILAND

Dipti Srinivasan
Member of the IEEE WCI Subcommittee, National University of Singapore, SINGAPORE

The Women in Computational Intelligence Sub-Committee (WCI) develops, promotes, organizes and runs activities directed to achieve and ensure equal opportunities to both genders in the society's life and computational intelligence arena. The WCI activities are directed to the wide community of women who study and work in computational intelligence, all women CIS members, IEEE Women in Engineering members, but also other women who are in the field of computational intelligence regardless of whether they are CIS or IEEE members.

The Women in Computational Intelligence Sub-Committee was established in 2004 in Budapest during the AdCom meeting on the previous IEEE CIS President Jacek Zurada's initiative with the primary objective of promoting and facilitating the role of women in computational intelligence and the impact they have in this area. Bernadette Bouchon-Meunier was the first chair of WCI and she is presently the IEEE CIS President Elect, thus becoming the first female president of the Society in 2020. The current WCI Sub-Committee is led by Vesna Šešum–Čavić (Chair), Keeley Crockett (vice-Chair) and Sansanee Auephanwiriyakul (vice-Chair), and consists of 17 members from different regions of the world, with different expertise and both academic and industrial backgrounds.

WCI General Activities

In the past three years, WCI actively worked on organizing panels/receptions both separately and jointly with Students and Young Professionals at several main conferences (in 2016, IEEE WCCI and IEEE SSCI; in 2017, IEEE CEC, FUZZ–IEEE and IEEE SSCI; in 2018, IEEE WCCI and IEEE SSCI; in 2019, IEEE CEC and FUZZ–IEEE). The WCI events, when organized separately, usually include inspiring talks of several women speakers. For example, the WCI panel and reception at IEEE WCCI 2018 encompassed three top tips for Women in Computational Intelligence by Bernadette Bouchon-Meunier from CNRS-Université Pierre et Marie Curie, France, Simone Ludwig from North Dakota State University, USA, and Mardé Helbig from University of Pretoria, South Africa. During the last WCI meeting at FUZZ–IEEE 2019, Anna Wilbik from Eindhoven University of Technology, the

Netherlands, Alina Zare from University of Florida, USA, and Valerie Cross from Miami University, USA briefly summarized their careers in the field of Computational Intelligence, and gave top tips for female PhD students and Young Professionals.

From cooperation with Young Professionals and Students, many joint receptions at different conferences appeared (e.g., the last joint reception took place at IEEE CEC 2019). During this reception, besides Mardé Helbig and Mengjie Zhang, our member Jialin Liu gave a short opening talk.

Our regular activities include strong relationships with IEEE WIE, IEEE CIS Young Professionals, IEEE CIS Students activities, IEEE CIS Webinars, IEEE CIS Industry, and IEEE CIS Chapters. In the previous years, a link between IEEE WCI and IEEE WIE was reinforced by activities of Keeley Crockett that provided two presentations on connections between WCI and WIE in 2017 (London and Liverpool, UK). Further, together with Annabel Latham, Keeley Crockett organized a joint sponsored event by IEEE CIS WCI, IEEE WIE UKI and Manchester Metropolitan University at the Manchester Science Festival: a Platform for Investigation called "Me and the Machine" Coding Robot, Big CI debate, CI inspired intelligent tutoring systems, and Avatar Border Guards making automated deception decisions.

Educational Activities

WCI believes that young people need to be educated and understand what is computational intelligence from an early age (i.e., age 5 upwards). The challenge is in developing materials and activities for each age group in a child's and young adult's life that inspires them to code, work out how algorithms work, have fun with nature inspired computing, learn with robots and link core science (artificial neural networks, fuzzy systems, evolutionary computation) to everyday applications they may have in their lives. WCI would like to promote positivity and exploration in CI to all. WCI also encourages everyone to become STEM Ambassadors within their own countries to promote education and inspire CI to young people. In order to illustrate this work, three brief examples of activities are presented:

1) Austwick C of E Primary School in rural North Yorkshire, United Kingdom learnt about artificial neural networks and how humans learn by building an artificial brain and adding their favorite memories. The pupils first observed how a machine learns by looking at how algorithms can be trained to recognize different images. The next task was to look at how artificial neural networks are created at a simplified level, i.e., "When you learn something new, neurons make new connections. When you remember something, a signal passes through these connections." The pupils then each built a neuron using pipe cleaners, wrote a memory and connected them together to build an artificial brain. The basics of Alzheimer's were also discussed through looking at how memories are lost, which could

be illustrated through the artificial brain. The age range was 6 to 11.

2) Algorithm design was taught using the Spaghetti and Marshmallow Engineering challenge. Pupils were shown images of famous structures such as the Eiffel Tower, the great Pyramids of Egypt etc, and asked to develop an algorithm to build such structures. The pupils then physically built their design using Spaghetti and Marshmallows and were able to "debug" their algorithm designs. The age range was 6 to 11.

3) The Hour of Code[1] was used to introduce pupils to coding regardless of geographical location. Scratch was used as a follow-on tool to learn the basics of coding. AI and robotics were introduced through coding Sphero robots to try and escape from a maze, or to perform evasive maneuvers. Ages ranged from 5 to 11 years old.

Further Activities

In order to disseminate knowledge on current topics in computational intelligence, we encourage women researchers to propose and give webinars. Three of our members (Alice Smith, Annabel Latham and Vesna Šešum-Čavić) gave webinars in April and June, 2019. Alice Smith spoke about Evolutionary Strategies for Difficult Engineering Design Problems, whereas Annabel Latham explained Automated Profiling of Individual Traits: Modelling Learning Styles

[1]https://hourofcode.com/uk/learn.

with Oscar Conversational Intelligent Tutoring Systems. Vesna Šešum-Čavić talked about Bio-Inspired Intelligence in Coping with Complexity of Distributed Software Systems.

Female IEEE CIS distinguished lecturers and speakers contribute to promoting WCI through organizing and engaging in activities in all regions. Some examples are:

❏ WCI promoting and IEEE CIS Distinguished lectures in Queretaro, Mexico (20 September 2018) by Alice Smith;

❏ Distinguished Lectures were given in Bogota and Medillin, Colombia by Alice Smith.

Further, we regularly promote and publicize WCI activities through Facebook and LinkedIn, and contribute to the IEEE CIS Newsletter. Our activities have been tracked via YouTube channel– in 2017, the interview of Bernadette Bouchon-Meunier: https://youtu.be/dC9jMGbo15o by CI²S Labs by Daniela López De Luise. Also, several activities in Argentina were organized by Daniela López De Luise during 2018: TRIC VII (Torneo Regional de Inteligencia Computacional VIII), a short Lecture for IEEE student branch at Jujuy and a short lecture at Mendoza. Daniela López De Luise also gave a brief introduction of the WCI at the Global Women in Data Science (WiDS) Conference, Stanford University.

Regarding specific activities of our members in the previous period, Bernadette Bouchon-Meunier had a plenary

talk at FUZZ-IEEE 2018, in Rio de Janeiro, Brazil, whereas Annabel Latham encouraged teenage girls to get into careers in CI in Connell Sixth Form College in Manchester, United Kingdom and gave a career talk about CI research and careers at Stockport Grammar School in 2018. As a significant future event, we announce that a Springer book on Women in Computational Intelligence edited by Alice Smith is in preparation.

Involvement of Female CIS Members in the IEEE CIS Activities

A questionnaire was sent to all female IEEE CIS members in May 2019, for the purpose of identifying women members of CIS who may be considered for volunteer leadership positions or as plenary lecturers, as well as those who could be elevated to Senior/Fellow members. A database of women, who were interested in answering the questionnaire, indicating their main fields of interest, is now available to all CIS technical committee chairs, conference general chairs, editors-in-chief, distinguished lecturer program committee chair, senior member committee chair and Fellow committee chair. All CIS leaders willing to invite women members of the IEEE CIS to suitable positions are welcome to ask for access to the database by contacting Jo-Ellen Snyder (j.e.snyder@ieee.org). Hopefully this database will facilitate a better participation and visibility of women in the IEEE CIS activities.