

2022 33rd Irish Signals and Systems Conference (ISSC 2022)

**Cork, Ireland
9 – 10 June 2022**



**IEEE Catalog Number: CFP22B57-POD
ISBN: 978-1-6654-5228-1**

**Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22B57-POD
ISBN (Print-On-Demand):	978-1-6654-5228-1
ISBN (Online):	978-1-6654-5227-4
ISSN:	2688-1446

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com



Thursday, 9 June

08:00 **Registration and Morning Coffee**

Main Hall

Chaired by: Ted Scully

09:00 **Welcome to ISSC 2022**

Lecture Hall IT1

Welcome

» Sean McSweeney

09:15 **Keynote #1 - Dr.Karen Weekes**

Lecture Hall IT1

10:00 **Keynote - Aoife Ni Mhuire - Machine Learning & AI**

Lecture Hall IT1

10:00 **Keynote- Professor Thomas Newe - Cyber Security**

Lecture Hall IT2

10:00 **Education and Training Programmes and opportunities in Manufacturing and Mechatronics in Europe.**

Lecture Hall IT3

10:45 **Track 1A - Machine Learning and AI**

Lecture Hall IT1



10:45 **FAIR Skin Lesion Classification Workflows using Transfer Learning...1**
» Mr. David Walshe, [Dr. Ruairí O'Reilly](#)

11:05 **Segmentation of Glioblastoma Via-Attention Neural Network...7**
» [Mr. WILLIAMS AYIVI](#), Prof. Liaoyuan Zeng, Mr. Sophyani Banaamwini Yussif, Ms. Judith Ayekai Browne, Mr. Victor Kwaku Agbesi, Mr. Francis Sam, Prof. Sean McGrath

10:45 **1B -Cyber Security**
Lecture Hall IT2

10:45 **Host-Based Intrusion Detection System for IoT using Convolutional Neural Networks...14**
» [Mr. Dominic Lightbody](#), Mr. Duc-Minh Ngo, Dr. Andriy Temko, Dr. COLIN MURPHY, Dr. Emanuel Popovici

11:05 **Fianán, Cuacha: Irish Cookie Banners...21**
» [Ms. Ashley Sheil](#), Prof. DAVID MALONE

11:25 **Tea and Coffee Break and Poster Session**
Main Hall

11:45 **Track 1C - Machine Learning & AI**
Lecture Hall IT1

11:45 **Hybrid Quantum Convolutional Neural Networks in TensorFlow Quantum...29**
» [Mr. Bishreht Khurelsukh](#)

12:05 **Edge-enabled Federated Learning for Vision based Product Quality Inspection...36**
» [Dr. Sourabh Bharti](#), Dr. Alan McGibney, Mr. Tristan O'Gorman

12:25 **An Iterated Local Search Approach to the Container Pre-Marshalling Problem...42**
» [Mr. John Farrelly](#), Dr. Diarmuid Grimes



Continued from **Thursday, 9 June**

- 12:45 **An Ontology-Based System for Cancer Registry Data...48**
» Ms. Shinead Casey, Dr. Pat Doody, Mr. Andrew Shields
- 11:45 **Track 1D - Signal Processing & AI**
Lecture Hall IT2
- 11:45 **Soft-Mask De-Mixing for Anechoic Mixtures...54**
» Mr. Swarnadeep Bagchi, Dr. Ruairí de Fréin
- 12:05 **Equivalent Circuit Modelling of Fluxgate Sensors in Verilog-A...60**
» Mr. Cian O'Donnell, Dr. Kafil Razeeb, Dr. Daniel O'Hare
- 12:25 **Re-Engineering of Undergraduate Analogue Electronics Laboratories during Covid-19...65**
» Dr. Kevin McCarthy, Dr. COLIN MURPHY, Dr. Emanuel Popovici
- 12:45 **AI Techniques To Automatically Detect Standardized Functional Test Patterns From Wearable Sensor Data...71**
» Ms. Vini Vijayan, Dr. James Connolly, Dr. Joan Condell, Dr. Philip Gardiner, Dr. Nigel McKelvey, Dr. Finbar (Barry) O'Shea, Mr. Tom O'Dwyer, Ms. Megan O'Grady, Dr. Fiona Wilson
- 13:05 **Track 1B - Poster Teaser**
Lecture Hall IT2
- 13:25 **Lunch**
Main Hall
- 14:30 **Keynote - Dr.Deirdre Kilbane**
Lecture Hall IT1



14:30 **Keynote - Prof. John Ringwood - Control Signals**
Lecture Hall IT2

14:30 **ISCC Workshop**
Lecture Hall IT3

15:15 **Track 1E - Communications & Networks**
Lecture Hall IT1

15:15 **Smart Optical Beamforming for Next Generation Wireless Empowered Communications, Power Transfer, Sensing and Displays: Building on the Past...77**

» Prof. Nabeel Riza

15:35 **A New Method for Monitoring Local Channel Conditions in Wi-Fi Networks...84**

» Ms. Luhan Wang, Prof. Mark Davis

15:55 **ML-Based Transmission Loss Estimation on Surveillance Radar Channels...90**

» Mr. Roman Raekow, Ms. Julia Fichtner, Prof. Michael Kuhn, Dr. Bernd-Ludwig Wenning

15:15 **Track 1G - Control Systems**
Lecture Hall IT2

15:15 **Analysis of Geometric Deformations in Off-Road Vehicles Using Dynamic Reduction-Based Virtual Models...96**

» Mr. Soumya Maulik, Mrs. Amruta Awasthi, Dr. Daniel Riordan, Prof. Joseph Walsh

15:35 **Artificial Pancreas Control for Diabetes using TD3 Deep Reinforcement Learning...104**

» Mr. Alan Mackey, Dr. Eoghan Furey



Continued from **Thursday, 9 June**

15:55 **Preliminary Investigations of the Validity and Interinstrument Reliability for Classification of Accelerometer Physical Activity Cut-Points Against Indirect Calimetry in Healthy Adults...110**
» Ms. Brid McDevitt, Dr. James Connolly, Mr. Damien Duddy, Dr. Ronan Doherty, Dr. Joan Condell

16:15 **Track 1H - Machine Learning & AI**
Lecture Hall IT1

16:15 **AVERT: An Automatic Verilog Testbench Generation Tool for Grammatical Evolution...119**
» Mr. Jack McEllin, Dr. Richard Conway, Prof. Conor Ryan

16:35 **Extraction of Teletext Subtitles from Broadcast Television for Archival and Analysis...127**
» Dr. David Laverty, Dr. John ORaw

16:15 **1L -Signal Processing**
Lecture Hall IT2

16:15 **AFOM: ADVANCED FLOW OF MOTION DETECTION ALGORITHM FOR DYNAMIC CAMERA VIDEOS...133**
» Ms. Ifeoluwapo Aribilola, Dr. Mamoona Asghar, Dr. Nadia Kanwal, Dr. Mohammad Samar Ansari, Dr. Brian Lee

16:35 **Automatic Speech Recognition for Irish: testing lexicons and language models...139**
» Dr. Mengjie Qian, Mr. Harald Berthelsen, Mr. Liam Lonergan, Prof. Ailbhe Ní Chasaide, Dr. Andy Murphy, Ms. Claire O'Neill, Dr. Neasa Ní Chiaráin, Dr. Christer Gobl



Continued from **Friday, 10 June**

- 11:00 **On the Application of Sentence Transformers to Automatic Short Answer Grading in Blended Assessment...145**
» [Ms. Abbirah Ahmed](#), Dr. Arash Joorabchi, Dr. Martin Hayes
- 10:00 **Session 2B - Cyber Physical Systems**
Lecture Hall IT2
- 10:00 **CMOS-Integrated High-Voltage Transformer for a Galvanically Isolated DC-DC Converter...151**
» [Dr. Pat Meehan](#), Dr. Karl Rinne
- 10:20 **Zero-Power Wireless Strain and Permittivity Sensor...158**
» [Mr. kevin mcgee](#), Dr. Prince Anandarajah, Dr. David Collins
- 10:40 **An IoT System For Post-Myocardial Infarction Patients During Cardiac Rehabilitation (CR) In Indonesia...163**
» [Mr. sani salsabil](#), Dr. Sheila Fallon, Dr. Desmond Cawley, Dr. Paul Jacob
- 11:00 **Liquids Inspection via Visible to Near Infrared to Short-Wave Infrared Bands Linear High Dynamic Range Capability Smart CAOS Camera...170**
» [Prof. Nabeel Riza](#)
- 11:20 **Tea and Coffee**
Main Hall
- 11:40 **Track 2D - Signal Processing**
Lecture Hall IT1
- 11:40 **Wavelet Based Denoising and Cross Correlation for Identifying Features in CTG Traces...175**
» Mr. Dovydas Kulcickis Gutas, [Prof. Liam Marnane](#)



- 12:00 **PRBS-based monitoring of flexible sensors for resource constrained systems...181**
» [Mr. Kevin Chubb](#), Dr. Richard Hayes, Dr. Damon Berry, Dr. Ted Burke
- 12:20 **Towards Image Processing-based Quantification of White Particles in Reconstituted Infant Formula...187**
» [Mr. Behrad Mozafari](#), Dr. Norah O'Shea, Dr. Mark Fenelon, Dr. Rudi Villing
- 12:40 **Drummistic Fingerprints: Unique Drummer Identification via the Application of Data Analytics & Machine Learning...193**
» Mr. Curtis Cunningham, [Dr. Eoghan Furey](#), Ms. Juanita Blue
- 13:00 **Accessible Circuit Diagrams...199**
» [Ms. Emma Pender](#), Mr. John Healy
- 11:40 **Track 2E - Signals and Systems for Sustainability**
Lecture Hall IT2
- 11:40 **Open Source Instrument Platform for Time Synchronised Power System Measurements...205**
» [Dr. David Laverty](#), Mr. Andres Felipe Moreno Jaramillo, Dr. Aoife Foley
- 12:00 **Optimization for a PV network with partial control and communication loss using virtual loads...210**
» Dr. Chi-Thang Phan-Tan, [Dr. Martin Hill](#)
- 12:20 **An Evaluation of Machine Learning Approaches for Milk Volume Prediction in Ireland...218**
» [Mr. Christian O'Leary](#), Dr. Conor Lynch
- 12:40 **Max-Cut Problem Implementation and Analysis on a Quantum Computer...226**
» [Mr. Ayaan Verghese](#), Mr. David Byron, Dr. Andreas Amann, Dr. Emanuel Popovici
- 13:20 **Closing Statements and Prize Giving**
Lecture Hall IT1

Continued from **Friday, 10 June**

ADDITIONAL PAPERS

Towards Synthetic Generation of Clinical Rosacea Images with GAN Models	232
<i>Anwasha Mohanty, Alistair Sutherland, Marija Bezbradica, Hossein Javidnia</i>	
Log4jPot: Effective Log4Shell Vulnerability Detection System.....	237
<i>Shein Sopariwala, Enda Fallon, Mamoon Naveed Asghar</i>	
An XGBoost Approach for Industrial Component Degradation Classification.....	242
<i>Rose Bain, Conor Lynch, Darren McDonnell, Kritchai Witthephanich</i>	
IoT-Based System for Monitoring Conditions in an Industrial Painting Booth	249
<i>Gustavo Velasco-Hernandez, Akseer Ali Mirani, Anshul Awasthi, Joseph Walsh</i>	
FREQUENCY-CENTROID FEATURES FOR WORD RECOGNITION OF NON-NATIVE ENGLISH SPEAKERS	255
<i>Pierre Berjon, Rajib Sharma, Avishek Nag, Soumyabrata Dev</i>	
Comparison of Transient and PNOISE Simulation Techniques for the Design of a Dynamic Comparator.....	261
<i>Elizabeth Gillen, Gaurav Panchanan, Brendan Lawton, Daniel O'Hare</i>	
Open Source Time Synchronised Sampled Value Logger for Power System Studies	266
<i>David Laverty, Miles Rusch, Dahlia Saba, Alexandra Von Meier</i>	
Multilateration Method for Locating GNSS Spoofing Attacks Affecting Substation Clocks	272
<i>Colin Kelsey, David Laverty, John O'Raw</i>	
Generating Reality-Analogous Datasets for Autonomous UAV Navigation Using Digital Twin Areas.....	277
<i>Thomas Lee, Susan McKeever, Jane Courtney</i>	
Sentiment Analysis on Covid-19 Vaccinations in Ireland Using Support Vector Machine	283
<i>Karla Cepeda, Rajesh Jaiswal</i>	
Clock Time Independent Distance Measurement Between Smartphones Using Audible PRBS	289
<i>Padraic McEvoy, Damon Berry, Ted Burke</i>	
Load-Adjusted Prediction for Proactive Resource Management and Video Server Demand Profiling	295
<i>Obinna Izima, R. De Frein</i>	
Design and Benefits of a Compact Microstrip-Fed Graphene Patch Antenna at 2.45GHz	301
<i>Andrew McCollum, Senan Morris, Nick Timmons</i>	
Hough Transform for Indirect Estimation of Wafer Placement Errors in Photoresist Spin Coating Processes	305
<i>Tamas Reiter, Michael McCann, James Connolly</i>	