



SCIENCE AND TECHNOLOGY ORGANISATION  
SPECIALISTS' MEETING on



## **Compressive Sensing applications for Radar/ESM and EO/IR imaging**

### **NATO-SET-265 Specialists' Meeting**

organized by the Sensors and Electronics Technology Panel, RFT Focus Group

06-07 May 2019, Salamanca, (ESP)

NATO UNCLASSIFIED open to AUS, CHE, FIN, SWE,

## **Agenda**

### **Monday, May 6, 2019**

- 08:00      **Registration and uploading of presentations**
- 09:00      **Opening remarks. VIP TBD (ESP)**
- 09:10      **Introduction to 265 RSM.** Chair SET-265: Laura Anitori (NLD), Co-chairs SET-265: Todd Du Bosq (USA) and Marco Martorella (ITA)
- 09:20      **Keynote 1      *Going off the deep end: Deep learning for signal recovery*, Richard Baraniuk (USA)**
- 10:00      **Questions/Answers**
- Session 1      *EO/IR Applications of CS.* Chair: A. Mahalanobis (USA)**
- 10:20      **1. Computational imaging strategies with single-pixel detection.** E. Tajahuerce, (ESP)
- 10:40      **2. Detection and localization of light flashes using a long range single pixel camera in SWIR.** C. Brannlund, A. Brorsson, D. Gustafsson and D. Bergstrom, (SWE)
- 11:00      *Coffee break***
- 11:20      **3. Compressed Range Imaging by Coding of Range Gates.** M. Laurenzis, E. Bacher, S. Schertzer, F. Christnacher (DEU)
- 11:40      **4. Compressive Multi-Mission Electro-Optical Sensor System.** L. Li, Y. Yang, J. Zhou, Y. Li; Kent Optronics, K. F. Kelly, A. Giljum; S. Agarwal, S. Nguyen; US Army, (USA)

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| 12:00            | <b>5. Deep Learning for Compressive Infrared and Hyperspectral Machine Vision.</b> Y. Xu, J. Chen, L. Lu, K. Kelly; (USA)                                           |
| 12:20            | <b>6. An efficient ADMM based reconstruction algorithm for Compressive SWIR Imaging</b> A. Güngör, O. F. Kar, H. E. Güven (TUR)                                     |
| 12:40            | <b>Questions/Answers/ photo</b>                                                                                                                                     |
| <b>13:00</b>     | <b>Lunch</b>                                                                                                                                                        |
| <b>Session 2</b> | <b><i>Real-Aperture Radar Applications of Compressive Sensing.</i></b> Chair: E. Ertin (USA)                                                                        |
| 14:00            | <b>7. Accelerated 2-D Direction of Arrival Estimation Using Gridless Compressive Sensing.</b> M. Kalfa and H. E. Guven, (TUR)                                       |
| 14:20            | <b>8. Sparse Source Selection for Colocated MIMO Radar.</b> G. Leus, S. P. Chepuri and M. Coutino (NLD)                                                             |
| 14:40            | <b>9. Compressive Sensing for GMTI with Random Arrays.</b> H. H. Kim and A. M. Haimovich (USA)                                                                      |
| 15:00            | <b>10. Direction of Arrival Estimation (DOA) with MIMO Radar with Compressive Illumination.</b> E. Ertin, (USA)                                                     |
| 15:20            | <b>11. Block Sparsity Based Spectrum Sensing for Cognitive Radar.</b> A. Aubry, V. Carotenuto, A. de Maio and M. Govoni (ITA)                                       |
| <b>15:40</b>     | <b>Coffee Break</b>                                                                                                                                                 |
| <b>Session 3</b> | <b><i>Synthetic Aperture Radar and Sonar.</i></b> Chair: D. Blacknell (GBR)                                                                                         |
| 16:00            | <b>12. Sparse 2D SAR Apertures for 3D SAR and Tomogram Image Formation.</b> D. Andre, M. Finnis and D. Blacknell, (GBR)                                             |
| 16:20            | <b>13. Comparison of Compressive Sensing Techniques for Multistatic SAR Image Formation and Exploitation.</b> G. A. J. Price, C. Moate, D. Andre and M. Finis (GBR) |
| 16:40            | <b>14. Relating Phenomenology to Measurement Matrix for Dropped Channel Polarimetric SAR.</b> J. A. Jackson and F. Lee-Elkin (USA)                                  |
| 17:00            | <b>15. Applications of Compressive Sensing on Sonar Data for Unexploded Ordnance under Sediment.</b> F. Ehlers, (DEU)                                               |
| 17:20            | <b>QUESTION/ANSWERS DISUSSIONS</b>                                                                                                                                  |
| <b>17:45</b>     | <b>End of Day 1</b>                                                                                                                                                 |

## Tuesday, Mar 7, 2019

- 09:00      **Keynote 2      Aspects of radar imaging based on compressive sensing, Joachim Ender (DEU)**
- 09:40      **Questions/Answers**
- Session 4      *Other Radar Imaging Techniques.* Chair: M. Martorella (ITA)**
- 10:00      **16. Augmentation of the Slow-Time  $k$ -Space for Narrowband High-Resolution Radar Imaging.** H.-T. Tran and E. Heading, (AUS)
- 11:20      **17. Compressive Sensing for Micro-Doppler Classification Using Interrupted Waveforms** - L. Anitori and W. van Rossum, (NLD)
- 10:40      **18. Compressive Sensing for Passive ISAR Imaging.** K. Kulpa, M. Baczyk, J. Misiurewicz, P. Samczynski and M. Malanowski , (POL)
- 11:00      **19. Performance Evaluation of Sparse Reconstruction-Based Imaging Methods ,** M. Martorella, D. Bekers, D. Kirkland and D. Cataldo, (ITA)
- 11:20      *Coffee Break***
- Session 5      *EO/IR Computational Imaging.* Chair: M. Laurenzis (DEU)**
- 11:40      **20. Utilizing Spatially Controlled Coherent Illumination to Acquire Spatially Resolved Images of Non-Line-of-Sight Objects .** M. P. Christensen, P. Rangarajan, ; SMU, O. Cossairt, F. Willomitzer; (USA)
- 12:00      **21. Compressive Imaging Through Scattering Media.** M. E. Gehm; (USA)
- 12:20      **22. Compressive sensing imaging through atmospheric turbulence.** G. Paunescu, D. Wegner, P. Lutzmann, E. Repasi (DEU)
- 12:40      **23. Task Specific Compressive Sensing for Target Detection.** A. Mahalanobis; UCF, (USA)
- 13:00      *Lunch***
- 14:00      Plenary Discussion**
- 15:00      *Coffee Break***
- Session 6      *Joint RF/EO Session.* Chairs: L. Anitori (NLD) and T. DuBosq (USA)**
- 15:20      **24. Clutter Rejection for Multi-Static Radars Using Compressive Sensing.** M. Kalfa, P. Stukovska and H. E. Guven, (TUR)

- 15:40      **25. A study on optimal number of measurements for compressive focal plane array reconstruction** O. F. Kar, A. Güngör, H. E. Güven (TUR)
- 16:00      **26. Compressive-Sensing Radar with Coded Aperture for Compressive Data Acquisition and ECCM.** R.Pribic (NLD)
- 16:20      **27. Implementation and evaluation of spectral compression of radar signals for ESM.** Y. K. Alp, A. B. Korucu, A. LeMeur, R. Plsek and A. Stove (TUR)
- 16:40      ***Closing Remarks.***
- 17:00      ***End of the Day 2.***