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SOTIRIOS A. TSAFTARIS, Ph.D.

Chair in Machine Learning and Computer Vision

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RESEARCH TRACK RECORD SUMMARY

- **Expertise** on machine learning theory and computational methods for representing data. Application focus in the area of extracting information from data in the natural and life sciences.
- **PhD** in 2006 from Northwestern University, USA in electrical engineering and computer science.
- **International work experience** in five countries (UK, USA, Italy, Greece, Japan).
- More than **140 publications** of multidisciplinary character in peer reviewed journals (highly ranked in medical image analysis and imaging) and conferences. Average impact factor = 4.1; h-index = 41.
- Work **recognized** with best paper awards (e.g. ISMRM, SCMR), journal covers (e.g. IEEE Signal Processing Magazine), prestigious fellowships (e.g. Onassis), and media coverage (New York Times, MIT Technology Review, and others). Invited to present as keynote (e.g. ICANN) or invited speaker.
- Extensive **funding** as principal or co- investigator (career £22.2m) from EPSRC, BBSRC, NIH, and Industry.
- Considerable **industry** impact and large network of **collaborators** in academia.
- Strong record of **service** to the academic community, including serving as editor and event organiser.
- Extensive record of **supervision** of students (6 current; 5 awarded) and research staff (current 2; alumni 5).

EDUCATION

PhD in Electrical Engineering and Computer Science *2006*
Northwestern University, Evanston, IL

MSc in Electrical and Computer Engineering *2003*
Northwestern University, Evanston, IL

Diploma in Electrical and Computer Engineering *2000*
Aristotle University of Thessaloniki, Greece

CURRENT EMPLOYER

Address: IDCOM-Institute of Digital Communications, School of Engineering, Room 2.06, Alexander Graham Bell Building, The King's Buildings, Thomas Bayes Rd, Edinburgh EH9 3FG, UK

Duties/responsibilities:

- As a leader of my research team at IDCOM it is my responsibility and duty to:
  - develop a research program in machine learning and image analysis with applications in medicine, biology, and natural sciences;
  - solicit funding, and recruit research staff; and
  - supervise and mentor team members
- As a faculty:
  - Participate in various committees and exam boards;
  - Teach courses at the undergraduate/post-graduate level (Electrical Engineering Discipline)

EMPLOYMENT HISTORY

Canon Medical/Royal Academy of Engineering Research Chair in Healthcare AI, The University of Edinburgh *April 2019 – Present*
Institute of Digital Communications, School of Engineering - http://tsaftaris.com

Chair in Machine Learning and Computer Vision (Full Professor), The University of Edinburgh *August 2019 – Present*

Chancellor's Fellow and Reader (US equiv. Associate Professor), **The University of Edinburgh** *August 2018 – July 2019*

Turing Fellow, The Alan Turing Institute *September 2017 – Present*

Chancellor's Fellow (Senior Lecturer Grade), The University of Edinburgh *September 2015 – July 2018*

Director, IMT Institute for Advanced Studies Lucca (Italy) *July 2012 – Oct 2016*
Pattern Recognition and Image Analysis Unit (PRIAn)

Assistant Professor, IMT Institute for Advanced Studies Lucca (Italy) *September 2011 – 2015*
Area of Computer Science and Applications

Adjunct Assistant Professor, Northwestern University (USA) *July 2011 – Sept 2016*
Departments of Electrical Engineering and Computer Science and Radiology, Feinberg School of Medicine

Research Assistant Professor, Northwestern University (USA) *January 2009 – July 2011*
Department of Radiology, Feinberg School of Medicine

Research Assistant Professor, Northwestern University (USA) *November 2006 – July 2011*
Department of Electrical Engineering and Computer Science

Visiting Researcher, Meiji University (Japan) *September 2005*
Institute of Applied DNA Computing, Kanagawa-Ken

Research Assistant, Northwestern University (USA) *July 2002 – July 2006*
Department of Electrical Engineering and Computer Science, Image & Video Processing Laboratory

Graduate Researcher, CERTH (Greece) *September 2000 – July 2001*
Informatics & Telematics Institute, Center for Research and Technology Hellas (CERTH) Greece

AWARDS AND HONORS

Best regular paper award, STACOM a MICCAI workshop *September 2017*
Magna Cum Laude award, top paper International Society for Magnetic Resonance in Medicine (ISMRM) *May 2012 & 2014*
Early Career Award finalist, Society for Cardiovascular Magnetic Resonance (SCMR) *February 2011 & 2019*
Distinguished Reviewer, Journal of Magnetic Resonance Imaging *Years 2011 and 2012*
New Entrant Stipend Award, International Society for Magnetic Resonance in Medicine (ISMRM) *February 2008*
Alexander S. Onassis Postgraduate Scholarship, Onassis Foundation *September 2001 – August 2005*
Murphy Fellowship, Northwestern University *September 2001 – September 2002*
Award of Excellence, Technical Chamber of Greece *September 2001 – September 2002*

GRANTS

Ongoing:

1. Royal Academy of Engineering (RCSRF1819\8\25) (**PI**)
   [£814,254: £189,254 from the Academy, £625,000 from Canon Medical]
   4/19 – 3/24
   Canon Medical / Royal Academy of Engineering Senior Research Fellow in Healthcare AI
2. Innovate UK (**School of Engineering PI**; Edinburgh PI: Parsons, UoE EPCC; Overall PI: Grossman, CSO Scottish Government)
   [£284,558 for School of Engineering; £611,000 for UoE; £16,000,000 total]
   01/19 – 12/21
   Industrial Centre for Artificial Intelligence Research in Digital Diagnostics (iCAIRD)
3. EPSRC-Dstl (EP/S000631/1) (**co-I;** Overall PI: Davies, UoE)
   [Total £4,092,206 ScE]
   07/18-06/23
   University Defense Research Collaboration [UDRC] 3: Signal Processing in the Information Age
4. MRC (MR/R025746/1) (**Edinburgh PI;** Overall PI: Pridmore, Nottingham)
   [£528,567 total]
   09/18-08/22
   PhenomUK - Crop Phenotyping: from Sensors to Knowledge [A technology touching life network]
5. National Institutes of Health (USA) (R01HL136578) (**Edinburgh PI**; Overall PI: Dharmakumar, USA)
   [$200,000 for School of Engineering; $1,700,000M Total (£1,230,000)]
   6/17-6/22

An Accurate Non-Contrast-Enhanced Cardiac MRI Method for Imaging Chronic Myocardial Infarctions: Technical Developments to Rapid Clinical Validation

6. BBSRC GCRF (BB/P023487/1) (**Engineering PI**; Overall PI: Doerner, UoE Biology)
   [£284,558 for School of Engineering; £594,981 UoE Total]
   05/17-12/18
   Improving root system architecture for enhanced drought tolerance and nutrient use efficiency in semi-arid agriculture of chickpea

Completed:

1. EPSRC First grant (EP/P022928/1) (**PI**)
   [£116,397 ScE]
   09/17-01/19
   CardiacA.I.: Machine learning for the analysis of multimodal cardiac MR images used in the diagnosis of coronary heart disease
2. BBSRC TRDF (BB/N02334X/1) (**Engineering PI**; Overall PI: McCormick, UoE Biology)
   [£3,493 for the School of Engineering; £151,637 UoE Total]
   10/16-3/18
   An affordable active photometric system for capturing real-time 3D responses to vegetation dense environments
3. National Institutes of Health (USA) (**Edinburgh PI**, Overall PI: Dharmakumar)
   [Transferred to UoE at £41,074; to ST £90,000; Total £1,100,000]
   9/13-9/17
   Reliable Evaluation of Coronary Artery Disease using Myocardial BOLD MRI with CO2
4. Marie Curie International Reintegration Grant (EU-FP7) (**PI**)
   [Total £85,000]
   9/11-9/15
   PHIDIAS: Phenotyping with a High-throughput, Intelligent, Distributed, and Interactive Analysis System
5. PiCloud Computing Inc (San Francisco, USA) (**PI**) (in kind contribution, Industrial)
   [Total 30k in-kind]
6. 4/12-12/13
   Use of commercial clouds for large-scale analysis
7. CCITT – US Department of Transportation (USA) (**Co-I**, Overall PI: Katsaggelos)
   [Total £79,000]
   4/11-12/12
   iTRAC-w: Intelligent Compression and Transmission of Traffic Video
8. CCITT – US Department of Transportation (USA) (**PI**; co-I: Katsaggelos)
   [Total £79,000]
   4/09-8/10
   iTRAC: Intelligent Compression of Traffic Video
9. CCITT – US Department of Transportation (USA) (**Co-I**, Overall PI: Katsaggelos)
   [Total £79,000]
   1/08-1/10
   Video Traffic Analysis for Abnormal Event Detection
10. The Andrew Mellon Foundation - Art Institute of Chicago (USA) (**Co-I**, PI: Katsaggelos)
    [Total £19,000]
    10/07-12/08
    Turning back the hand of time: digital reconstruction of early versions of Matisse's "Bathers by a River"
11. The San Diego Foundation (USA) (**Co-I**, PI: Katsaggelos)
    [Total £76,000]
    10/06-4/08
    Universal Microarrays for High Throughput Gene Analysis

RELATIONSHIPS WITH INDUSTRY

- **Canon Medical Research Europe** (Dr Poole, Dr Smout, Dr O'Neil; UK): Deep learning in healthcare.
- **Medviso** (Dr Heiberg; Lund, Sweden): Cardiac segmentation and registration plugins for Segment
- **Siemens Healthcare** (Dr Zuehlsdorff; USA, Germany): Cardiovascular BOLD MRI imaging/analysis
- **PiCloud Computing Inc.** (now part of Dropbox) (Mr Elkabany, CEO; USA): Large-scale cloud computing in Python (served also as scientific advisor)

PROFESSIONAL AND ACADEMIC ACTIVITIES

Participation in policy and stakeholder events *2011 – Present*

- Chief Scientist's Office meeting to devise a Scottish-wide bid for the call on Creating a network of digital pathology, imaging and AI centres as part of the Industrial Strategy Challenge Fund, May 2018, Edinburgh
- AI: Stakeholders meeting, Royal College of Radiologists in partnership with The Alan Turing Institute, Health Data Research UK (HDR UK) and the Engineering and Physical Sciences Research Council, May 2018, London
- NHS Health and Social Care Network, Nov 2018, Aberdeen
- European Commission, Scientific support to agriculture: competitiveness, quality and sustainability, European Commission, Joint Research Center, April 2014 Athens, Greece
- Innovate UK, UK-US Meeting on Technology exchange for phenotyping, Jan 2017, Arizona, USA

Grant Reviewer *2009 – Present*

- National Institutes of Health (NIH, USA) Reviewed challenge grant applications for the Surgical Sciences, Biomedical Imaging and Bioengineering special emphasis panel. June/July 2009
- German Federal Ministry of Education and Research (Germany). July 2011
- Biotechnology and Biological Sciences Research Council (BBSRC, UK). Aug 2015
- Leverhulme Trust (UK). Mar 2016
- British Heart Foundation (BHF, UK). Aug 2017
- National Science Foundation (NSF, USA). Nov 2017
- Netherlands Organisation for Scientific Research (NWO). Aug 2017, Feb 2018
- European Research Council (ERC, EU). May 2018

Associate Editor *2011 – Present*

- IEEE Transactions on Medical Imaging, since 4/2018
- IEEE Journal of Biomedical and Health Informatics (formerly IEEE Transactions on Information Technology in Biomedicine), since 7/2011
- Digital Signal Processing (DSP), Elsevier 7/2014-4/2018

Guest Editor *September 2014 & 2015*

Simulation and Synthesis in Medical Imaging – IEEE Transactions on Medical Imaging 2017 (with A. Frangi, Leeds; and J. Prince, John Hopkins University)
Joint Special Issue on Reproducible Research in Signal Processing - Digital Signal Processing & Software X 2016 (with O Gerek, Anadolu; B. Boashash, Queensland; M. Leszczuk, AGH; W. Armour, Oxford; and D. Wallom, Oxford)
Computer Vision and Image Analysis in Plant Phenotyping - Machine Vision and Applications 2015 (with H. Scharr, Juelich)

Conference organizing committee *2018 – Present*

European Conference on Computer Vision (ECCV 2019), Glasgow, UK,
Tutorial Chair
IEEE International Conference on Image Processing (ICIP 2018), Athens Greece,
Doctoral Symposium Chair

Workshop Organizer *2014 – Present*

Simulation and Synthesis in Medical Imaging - Medical Image Computing and Computer Assisted Interventions (MICCAI) 2016
Simulation and Synthesis in Medical Imaging – MICCAI 2017
Computer Vision Problems in Plant Phenotyping - European Conference on Computer Vision (ECCV) 2014
Computer Vision Problems in Plant Phenotyping - British Machine Vision Conference (BMVC) 2015
Computer Vision Problems in Plant Phenotyping – International Conference Computer Vision (ICCV) 2017
Computer Vision Problems in Plant Phenotyping – British Machine Vision Conference (BMVC) 2018
Computer Vision Problems in Plant Phenotyping – IEEE Computer Vision and Pattern Recognition Conference (CVPR) 2019

Conference Area Chair *2015 – Present*

Medical Image Computing and Computer Assisted Interventions (MICCAI) 2018, Granada, Spain
IEEE International Conference on Multimedia and Expo (ICME 2018), San Diego USA
International Conference on Computer Vision (ICCV 2017), Venice, Italy

19th International Conference on Image Analysis and Processing (ICIAP 2017), Italy
IEEE Multimedia Signal Processing Workshop (MMSP 2016), Canada
IEEE International Conference on Visual Communications and Image Processing (VCIP 2015), Singapore

Technical Program Committee Member
IEEE IPTA 2012, Special Session on High Performance Computing in Computer Vision Applications, Istanbul Turkey (2012); 4th International Symposium on Information Technologies in Environmental Engineering, Thessaloniki, Greece (2009); Kellogg Nanobusiness Conference, Evanston, IL (2004); Int. Conference on Augmented, Virtual Environments and Three-Dimensional Imaging, Mykonos, Greece (2001)

Reviewer *2001 – Present*

- IEEE Transactions on Image Processing, Signal Processing, Information Technology in Biomedicine, Circuits and Systems for Video Technology, Information Forensics & Security, Computational Biology and Bioinformatics
- Circulation; JACC; PloS Biology; Nature Scientific Reports; Journal of Magnetic Resonance Imaging; EURASIP Journal of Applied Signal Processing; Computerized Medical Imaging and Graphics
- MICCAI; IEEE International Conferences on Image Processing (ICIP), on Acoustics, Speech, and Signal Processing (ICASSP); International Conference of Digital Signal Processing
- International Conference of the International Society for Magnetic Resonance in Medicine (ISMRM)

TEACHING AND UNIVERSITY SERVICE

TEACHING (Undergraduate; Graduate)

- **University of Edinburgh (UK):**
  Lecturer, Machine Learning in Signal Processing (PGEE11175) – MSc *Winter 2019*
  Lecturer, Electromagnetics, Signals & Communication Systems 3 (ELEE09028) – UG *Winter 2018/2019*
  Lecturer, Advanced Concepts in Signal Processing (PGEE11020) – MSc *Winter 2017/2018*
  Lecturer, Signals & Communication Systems 3 (ELEE09027) – UG *Winter 2016/2017*

- **IMT Institute for Advanced Studies (Italy):**
  Coordinator, PhD Curriculum in Image Analysis of the Computer, Decision, and Systems Science / CDSS track – G *Academic years 2012-2014*
  Lecturer, Pattern Recognition and Machine Learning – G *Academic years 2012-2014*
  Lecturer, Large Scale Image Analysis for Natural and Life Sciences – G *Academic years 2012-2014*
  Lecturer, Advanced Topics in Image Analysis – G *Academic years 2013-2014*

- **Northwestern University (USA):**
  Lecturer, Introduction to Electrical Engineering (EECS 202) – U *Academic years 2008-2010*
  Teaching Assistant, Digital Signal Processing (ECE 359) – UG *Fall 2003 & Fall 2004*
  Guest Lecturer, Multimedia Signal Processing (ECE 420) – G *Spring 2005*
  Guest Lecturer, Digital Image Processing (ECE 420) – G *Winter 2004 & Winter 2005*
  Guest Lecturer, Signals and Systems (EECS 222) – U *Spring 2003 & Winter 2008*

- **Mediterranean Agronomic Institute of Chania (Greece):**
  Visiting Lecturer, Advanced Topics in Digital Image Analysis (ENM532.1410.3) – G *June 2013/2014*

- **University of Pavia:**
  Visiting Lecturer, Remote Sensing in Agriculture – G (MSc level) *2015-present*

UNIVERSITY SERVICE

Board Member, MSc and Undergraduate study boards *Jan 2016 – Present*
University of Edinburgh, School of Engineering, UK

Committee Member, Research Data Service steering group *June 2017 – Present*
University of Edinburgh, School of Engineering, UK

Committee Member, Computing Committee *September 2012 – Sept 2011*
IMT Institute for Advanced Studies Lucca, Italy

Committee Member, Faculty Council *January 2012 – Sept 2011*
IMT Institute for Advanced Studies Lucca, Italy

Committee Member, Academic Council *September 2011 – Sept 2011*
IMT Institute for Advanced Studies Lucca, Italy

Committee Member, Graduate Student Advisor Committee *June 2004 – June 2006*
McCormick School of Engineering & Applied Sciences, Northwestern University

International Liaison, Chair *September 2004 – June 2006*
Northwestern University Nanoalliance
Committee Member, Graduate and Curriculum Committee *September 2003 – September 2006*
Northwestern University, Department of Electrical Engineering and Computer Science

SUPERVISION OF STAFF AND STUDENTS

PhD supervisor (unless otherwise noted I had the sole role)
1. X. Liu (UoE PhD, -), Learning to disentangle
2. P. Sofokleous (UoE PhD, -), Learning to compress [industry funded]
3. G. Jacenkow (UoE PhD,-), Deep learning for clinical decision support [funded by Canon Medical]
4. X. Tian (UoE PhD,-), Pseudo healthy synthesis as a latent variable
5. A. Chartsias (UoE PhD,-), Multimodal cardiac segmentation
6. A. Dobrescu (UoE PhD,-), Multimodal machine learning for phenotyping
7. V. Giuffrida (IMT PhD, viva Dec 2018), Invariant image representations (now Lecturer at Napier University)
8. I. Oksuz (IMT PhD, Dec 2017), Cardiovascular BOLD MRI joint myocardial segmentation and registration (now postdoc @ King's College London, UK)
9. M. Minervini (IMT PhD, PhD 2015), Affordable sensing and application-aware compression (now entrepreneur)
10. Z. Chen (NU PhD, 2014), Surveillance aware video transmission A (now Google)
11. E. Soyak (NU PhD, 2011), Surveillance aware video compression A (now CEO at LifeMote)
12. F. Yang (NU PhD, 2011), Surveillance analytics and mining A (now at Amazon)

Co-supervision: A Prof. Katsaggelos at Northwestern University (NU);

Postdoctoral Research Associate (Line Manager)
1. S. Thermos (PhD Greece 2019), Learning to disentangle (funded by Canon Medical / RAENG)
2. N. Dionelis (PhD Imperial College 2019), Deep Generative Models for Anomaly Detection (ongoing)
3. V. Giuffrida (PhD IMT viva Dec 2018), Deep learning in computer vision (now Lecturer at Napier University)
4. T. Joyce (PhD UoE 2016), Deep learning in cardiac MRI (now PostDoc at ETH Zurich)
5. M. Minervini (PhD IMT 2016), Joint classification and data compression (now Entrepreneur)
6. A. Mukhopadhyay (PhD USA 2014), Cardiac MR segmentation (now Junior Research Group Leader, TU Darmstadt, Germany)
7. M. Bevilacqua (PhD France 2014), Ischemia detection with dictionary learning (now Univ. of Bordeaux, France)
8. C. Rusu (PhD Romania 2012), shift-invariant dictionary learning (now Lecturer, National University Ireland)

MSc, BSc, and Interns
1. H. Chen (UoE BEng, 2019), *BEng*, Link completion in graphs with deep learning (now MSc at CMU, USA)
2. A. Laurynovich (UoE BEng, 2018), *BEng*, Camera Sensors for Internet of Things (now MSc at U. Essex)
3. F. Chen (UoE MSc, 2017), *MSc,* Crowdsourcing in plant leaf counting **[best dissertation award]** (now PhD student at Nottingham)
4. X. Tian (UoE MSc, 2017), *MSc,* Compression invariant feature learning **[IDCOM scholarship winner]** (now PhD student at Edinburgh)
5. M. Chai (UoE MSc, 2017), *MSc,* Learning to detect rare events
6. S. He (UoE MSc, 2016), *MSc,* Active learning in object counting (now PhD student at Exeter)
7. R. Pei (UoE MSc, 2016), *MSc,* Segmentation of pathology in images from cardiac MRI
8. L. Song (UoE MSc, 2016), *MSc,* Joint compression and classification
9. M. Damiano (IIT, 2012), *Internship*, Image analysis for small animal brain MRI (structural)B (now Engineer TBS GB Telematic and Biomedical Services Ltd)
10. L. Dodero (IIT, 2012), *Internship*, Image analysis for small animal brain MRI (DTI)B (now Esaote, Genova)
11. K. Hayashi (NU BSc, 2011), *Undergraduate project*, Painting restoration and Illumination correction (now TapSense)
12. B. Cheng (NU BSc, 2011), *Undergraduate project*, DNA thermodynamics (now PepsiCo)
13. D. Babacan (NU MSc, 2009), *Project*, Surveillance analytics and object tracking A (now Google)
14. E. Maani (NU MSc, 2009), *Project*, Video Fingerprinting A (now Apple)
15. M. Luessi (NU MSc, 2008), *Thesis*, Video Up-rate Conversion A (now CEO BrainFPV)
16. R. Chin (NU BSc, 2008), *Undergraduate project*, Cardiac MR image registration (now Abbott Medical)
17. A. Targowska (NU BSc, 2008), *Undergraduate project*, Painting Restoration A (now McAndrews, Held & Malloy, Ltd)
18. A. Schlegel (NU-HSR, 2007), *diploma thesis*, Visiting scholar from HSR-Rapperswil Switzerland, Cine Cardiac MRI segmentation and tracking A
19. V. Andermatt (NU-HSR, 2007), *diploma thesis,* Visiting scholar from HSR-Rapperswil Switzerland, Cine Cardiac MRI segmentation and tracking A
20. D. Shiel (NU MSc, 2007), *Thesis*, AV Speech Recognition with Active Contour A (now Verizon)

21. R. Ahuja (NU MSc, 2006), *Thesis*, DNA Microarray Image Analysis [A] (now CTO ZypMedia)
    Co-supervision: A With Prof. Katsaggelos at Northwestern University (NU); **B** With Dr. Gozzi at Istituto Italiano di Tecnologia (IIT)

MEMBERSHIP IN PROFESSIONAL BODIES

Italian Chapter of IAPR: Italian Association for Pattern Recognition	*September 2012– Present*
SCMR: Society for Cardiovascular Magnetic Resonance	*December 2010 – Present*
ISMRM: International Society for Magnetic Resonance in Medicine	*February 2008 – Present*
IEEE Senior Member (2018): Institute of Electrical and Electronic Engineers	*July 2002 – Present*
Chartered Engineering in Greece (Technical Chamber of Greece)	*November 2000 – 2011*
Hellenic Association of Mechanical & Electrical Engineers	*November 2000 – 2011*

CONFERENCE TALKS AND INVITED PRESENTATIONS (SELECTED)

Invited Keynotes, Tutorials and Conference Presentations

1. "Disentangled representation learning data in medical imaging", Keynote, STACOM, October 2019.
2. "Healthcare AI", Invited Lecture, British Embassy, Japan Tokyo, October 2019, host: Scottish Enterprise and Canon Medical.
3. "Simulation and Synthesis" an International Conference on Acoustics Speech and Signal Processing (ICASSP) 2019 Tutorial, May 2019.
4. "Machine learning in phenotyping: doing more with less", Keynote, Gatersleben Scientific Conference 2019, Gatersleben, Germany, Mar 2019.
5. "Joint motion compensation and myocardial segmentation with shallow and deep models", Invited, SCMR/ISMRM workshop on The Emerging Role of Machine Learning in Cardiovascular Magnetic Resonance Imaging, Seattle, USA, Feb 2019.
6. "Multimodal deep learning in biomedical image analysis", Keynote, International Conference on Artificial Neural Networks, Rhodes, Greece, Oct 2018,
7. "Deep (machine) learning in phenotyping", Keynote, Phenome 2018, Arizona, USA, Feb 2018.
8. "Machine learning can empower trait extraction in affordable phenotyping", Invited, IPPN Affordable Phenotyping Workshop, Jülich, Germany, May 2017.
9. "Computer Vision and Plant Phenotyping -a match made in heaven", Keynote at British Machine Vision Association (BMVA) technical meeting on: Plants in Computer Vision, Nov. 2016.
10. "Easy Plant Phenomics," Invited Scientific support to agriculture: competitiveness, quality and sustainability, European Commission, Joint Research Center, Athens, Greece, April 2014.
11. "DNA-Based Digital Signal Processing and its Application to Engineering Problems," Plenary, *First International Meeting on Applications of DNA Computing to Engineering Problems*, Meiji University, Tokyo, Japan, Sept. 2005.

Invited Seminar Presentations

12. "Multimodal biomedical image analysis," Usher Informatics Institute, Sept 2019, Host: Prof. Sudlow.
13. "Multimodal biomedical image analysis," King's College London, May 2019, Host: Dr Oksuz.
14. "Learning to synthesize signals and images," Bristol Vision Institute, 17 Nov 2017, Host: Prof. Bull.
15. "Phenotyping, computer vision, and sensing -a match made in heaven", Queen Mary University London, Host: Prof. Cavallaro, Nov. 2016.
16. "Affordable imaging of plants and trait analysis with Phenotiki", Science and Advice for Scottish Agriculture (SASA), Host: Prof. Sadler, June 2016.
17. "Towards automated pixel-wise detection and visualization of area at risk at rest without contrast agents using cardiac BOLD MRI", Cedars Sinai Medical Center, Host: Dharmakumar, Jan 2016.
18. "Personalized 'needle-free' imaging for cardiac MRI," Yale University, Host: Prof. Papademetris, Jan 2016.
19. "Affordable plant phenotyping: the challenges and opportunities," The University of Nottingham, Host: Prof. Pridmore, Nov. 2015.
20. "Personalized 'needle-free' imaging for cardiac MRI," Univ. of Sheffield, Host: Prof. Frangi, Nov. 2015.
21. " 'Needle free' ischemia assessment with cardiac BOLD MRI**,"** Queens Medical Research Institute (Edinburgh), Host: Dr Semple, Nov. 2015.
22. "Computer Vision and Phenotyping-A Match Made in Heaven", Italian Institute of Technology, Host: Prof. Murino, June 2015.
23. "Towards personalized 'one button imaging' for cardiac MRI," The University of Edinburgh, Host: Dr. Safari, June 2015.

24. "Affordable plant phenotyping: the challenges and opportunities," Juelich, Host: Dr. Scharr, Dec. 2014.
25. "Affordable Plant Phenotyping," ENEA C.R. Casaccia UTAGRI - Green Biotechnologies Laboratory, Host: Dr. Giuliano, April 2013.
26. "Imaging-based phenotyping for life sciences," Dip. di Ingegneria dell'Informazione Università di Siena, Host: Prof. Gori, March 2012.
27. "Intelligent Video Compression for Tracking Applications," Dip. di Elettronica - Politecnico di Torino, Host: Prof. Magli, June 2010.
28. "Research in the intersection of signal processing and life sciences: From DNA and AFM, to MRI and back," *University of Pennsylvania*, Dept. of Radiology, Host: Prof. Davatzikos, July 2008.
29. "Digital Signal Processing and Life Sciences: A Multiview Perspective," *University of Chicago*, Dept. of Ecology and Evolution, Host: Prof. Borevitz, April 2008.
30. "The Molecular and Organic Future of Digital Signal Processing," *University of Illinois at Chicago*, Dept. of Electrical and Computer Engineering, Host: Dr. Schonfeld, Oct 2007.
31. "Simulations of DNA based storage of digital signals," University of Tokyo, Japan, Host: Prof. Suyama, Sept 2005.
32. "The Molecular Future of Digital Signal Processing":
    a. *Hong Kong University of Science & Technology*, Hong Kong, Host: Prof. Au, Sept 2005.
    b. *Uppsala University*, Uppsala Sweden, Host: Prof. Stoika, Aug 2005.
    c. *Ericsson Research,* Kista Sweden, Host: Dr. Karlsson, Aug 2005.
33. "DNA-Based Digital Signal Processing: Theory and Applications," *1st Kellogg Nanobusiness Conference: Exploring Opportunities in Nanobusiness*, Evanston, IL, USA, April 2004.
34. "DNA Computing: Applications in DSP, Security and Biotechnology," *Integrated Genomics*, Chicago, IL, Host: Dr. Kyrpides, March 2004.

SOFTWARE AND DATASETS

- **Disentangled learning:** code for learning disentangled representations in biomedical data https://github.com/agis85/anatomy_modality_decomposition
- **Factorised learning:** code for learning factorised representations in biomedical data https://github.com/agis85/spatial_factorisation
- **Disentangled temporal learning:** code for learning disentangled representations in biomedical data with temporal dynamics https://github.com/gvalvano/sdtnet
- **Pheno-Deep-Counter:** A deep learning based multi-instance multimodal object counter https://bitbucket.org/tuttoweb/pheno-deep-counter
- **Multimodal Brain Synthesis:** Tensorflow implementations of several of our papers on synthesis https://github.com/agis85/multimodal_brain_synthesis
- **Restricted Boltzmann Machine Matlab Toolbox:** A toolbox implementing various forms of RBMs https://bitbucket.org/teamrbm/rbm
- **Phenotiki:** Open source open hardware platform for affordable plant phenotyping http://phenotiki.com, as of now has been downloaded by 100 users and is actively used by 30 labs in the world
- **The PRL – CVPPP dataset:** A collection of annotated data for computer vision research in plant phenotyping https://www.plant-phenotyping.org/datasets, as of now it has been downloaded 2000 times, and cited 54 times.
- **Circulant Dictionary Learning:** An explicit formulation to shift invariant dictionary learning in MATLAB, till Sept 2016, the software was used by 40 researchers.
- **Mouse MRI Phenotyping:** A collection of pipelines (scripts) for mouse phenotyping based on ANTs
- **Large Scale Image Analysis on Commercial Clouds:** A collection of python functions for PiCloud
- **A toolbox for Plant Phenotyping:** A MATLAB and Bisque-iPlant hosted implementation for plant segmentation and analysis
- **TiXiS-PiXiS:** DNA thermodynamics toolbox for MATLAB. [on request]

MEDIA COVERAGE

AI for Healthcare

- **Interview in Greek Huffington Post, 29** September 2019 (link)

Painting (Matisse) Colorization

- **more than 5000 appearances in online and print media**
- **Interviews and Articles (chronological order):**
    - *The New York Times*, 9 July 2010 (link)
    - *McCormick News*, 12 July 2010 (link)
    - *Northwestern University Front page*, 12 July 2010 (link)

- MSNBC's Cosmic Log, 12 July 2010 (link)
- *PhysOrg*, 12 July 2010 (link)
- *MIT Technology Review*, 19 July 2010 (link)
- *The Daily Northwestern*, 22 July 2010 (link)
- *TA NEA*, Greek Newspaper, 31 July 2010 (link)
- *McCormick Magazine*, Fall 2010 (link)
- *ΤΕΧΝΟΓΡΑΦΗΜΑ*, (in Greek), Journal of Technical Chamber of Greece, 15 January 2011 (link)
- *Καθημερινή*, Greek Newspaper, 3 March 2011 (link)

DNA-based digital signal processing

- **more than 3000 appearances in online and print media**
- **Interviews and Articles (chronological order):**
  - *McCormick News*, April 4 2008 (link)
  - *PhysOrg*, April 7 2008 (link)
  - *Science Daily*, April 8 2008 (link)

PUBLICATIONS

List of publications
Publications are presented in reverse chronological order. When possible, links to available PDF preprints are indicated as [PDF] or links to the publishers websites are indicated as [Full text].
Preprints can also be found at http://tsaftaris.com/Publications.html
Underlined names indicate (ex or current) student/RA/postdoc.

Each paper contains in brackets the following **[IF: XX; yyC]** where XX denotes impact factor (2017) when available and yyC denotes number of citations [as of 2018] from Google Scholar, when available.

Refereed International Journals

1. A. Chartsias, T. Joyce, G. Papanastasiou, S. Semple, M. Williams, D. Newby, R. Dharmakumar, S.A. Tsaftaris, "Disentangled Representation Learning in Cardiac Image Analysis," Medical Image Analysis, Volume 58, December 2019 [preprint] [Full text] [code].
2. R. Boloix-Tortosa, J.J. Murillo-Fuentes, S.A. Tsaftaris, "The Generalized Complex Kernel Least-Mean-Square Algorithm," *IEEE Transactions on Signal Processing,* to appear, 2019 [preprint] [PDF].
3. T. Bontpart, C. Concha, M.V. Giuffrida, I. Robertson, K. Admkie, T. Degefu, N. Girma, K. Tesfaye, T. Haileselassie, A. Fikre, M. Fetene, S.A. Tsaftaris, P. Doerner, "Affordable and robust phenotyping framework to analyse root system architecture of soil-grown plants," submitted, [preprint]
4. S.A Tsaftaris, H. Scharr, "Sharing the Right Data Right: A Symbiosis with Machine Learning," *Trends in Plant Science*, vol. 24, no. 2, pp 99-102, Feb 2019. [Full text] [IF: 12.15] [Website]
5. M.V. Giuffrida, P. Doerner, S.A. Tsaftaris, "Pheno-Deep Counter: a unified and versatile deep learning architecture for leaf counting," *The Plant Journal*, In Press. 2018 [Full text][PDF] [Source Code] [IF: 5.9]
6. (editorial) A. Frangi, S.A. Tsaftaris, J. Prince, "Simulation and Synthesis in Medical Imaging," *IEEE Trans. on Medical Imaging*, vol. 37, no. 3, pp. 673-679, March 2018. [Full text] [IF: 3.94; 1C]
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8. I. Oksuz, A. Mukhopadhyay, R. Dharmakumar and S. A. Tsaftaris, "Unsupervised Myocardial Segmentation for Cardiac BOLD," in *IEEE Trans on Medical Imaging*, vol. 36, no. 11, pp. 2228-38, Nov. 2017. [Full text][PDF] [IF: 3.94]
9. A. Chartsias, T. Joyce, V. Giuffrida, and S.A. Tsaftaris, "Multimodal MR Synthesis via Modality-Invariant Latent Representation," *IEEE Trans on Medical Imaging*, vol. 37, no. 3, pp. 803-814, Mar. 2018. [Full text] [PDF] [Source code] [IF: 3.94; 12C]
10. V. Giuffrida, F. Chen, H. Scharr, S.A. Tsaftaris, "Citizen crowds and experts: observer variability in image-based plant phenotyping," *Plant Methods*, Feb. 2018, vol. 14, no. 12. [PDF] [Zooniverse site] [IF:3.5; 2C]
11. A. Suinesiaputra, P. Ablin, X. Alba, M. Alessandrini, J. Allen, W. Bai, S. Cimen, P. Claes, B. Cowan, J. D'hooge, N. Duchateau, J. Ehrhardt, A. Frangi, A. Gooya, V. Grau, K. Lekadir, A. Lu, A. Mukhopadhyay, I. Oksuz, N. Parajuli, X. Pennec, M. Pereanez, C. Pinto, P. Piras, M.-M. Rohe, D. Rueckert, D. Saring, M. Sermesant, K. Siddiqi, M. Tabassian, L. Teresi, S. Tsaftaris, M. Wilms, A. Young, X. Zhang and P. Medrano-Gracia, "Statistical shape modeling of the left ventricle: myocardial infarct classification challenge", *IEEE Journal of Biomedical and Health Informatics*. 2017 [Full text] [IF: 3.45; 9C]
12. H-J Yang, D. Dey, J. Sykes, M. Klein, J. Butler, M. Kovacs, O. Sobczyk, B. Sharif, X. Bi, A. Kali, I. Cokic, R. Tang, R. Yumul, A. Conte, S.A Tsaftaris, M. Tighiouart, D. Li, P. Slomka, D. Berman, F. Prato, J. Fisher, R. Dharmakumar, "Arterial CO2 as a Potent Coronary Vasodilator: A Preclinical PET/MR Validation Study with Implications for Cardiac Stress Testing," *Journal of Nuclear Medicine*. 2017 [Full text] [IF: 6.64; 1C]
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14. S.A. Tsaftaris, M. Minervini, H. Scharr, "Machine Learning for Plant Phenotyping Needs Image Processing," *Trends in Plant Science*, vol 21, no. 12, pp.989-91, Dec. 2016. [PDF][Full text] [IF: 11.9; 19C]
15. (editorial) H. Scharr, H. Dee, A.P. French, S.A. Tsaftaris, "Special issue on computer vision and image analysis in plant phenotyping," *Machine Vision and Applications*, 2016, vol. 27, no. 5, pp. 607-9. [Full text] [IF: 2.00; 5C]
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48. (invited) S.A. Tsaftaris, V. Hatzimanikatis, A.K. Katsaggelos, “*In silico* estimation of annealing specificity of query searches in DNA databases”, *Journal of Japan Society of Simulation Technology (JSST)* special issue "Application and Simulation of DNA Computing", vol. 24, no. 4, pp. 268-276, Dec 2005. [PDF] [5C]
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53. R. Dharmakumar, S.A. Tsaftaris, H.-J. Yang, D. Li, “Cardiovascular Magnetic Resonance Assessment of Myocardial Oxygenation,” Editor(s): Warren J. Manning, Dudley J. Pennell, Cardiovascular Magnetic Resonance (Third Edition), pp. Pages 84-96.e3, ISBN 9780323415613, Elsevier, 2019. [Full text]
54. H. Scharr, T. Pridmore, S.A. Tsaftaris, *Editorial: Computer Vision Problems in Plant Phenotyping, CVPPP 2017 -- Introduction to the CVPPP 2017 Workshop Papers,* The IEEE International Conference on Computer Vision (ICCV), 2017, pp. 2020-2021. [link]
55. S.A. Tsaftaris, A. Gooya, A Frangi, J. Prince, *Simulation and Synthesis in Medical Imaging: First International Workshop, SASHIMI 2017, Held in Conjunction with MICCAI 2017, Quebec City, September 10, 2017, Proceedings*. Lecture Notes in Computer Science, vol. 10557, Springer. 2017. [link]
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57. M. Minervini, C. Rusu, S. A. Tsaftaris, “Computationally efficient data and application driven color transforms for the compression and enhancement of images and video”, in Color Image and Video Enhancement. Springer, 2015, ch. 12. [PDF]
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Patents

62. R. Dharmakumar, D. Li, S.A. Tsaftaris, "Assessment of coronary heart disease with carbon dioxide," World Wide Patent, US 20140088406 A1, granted Nov 8 2012. [description]

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