

A.I. (Antonis) Vakis, PhD

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Positions

1. Assistant Professor (Tenure Track) in Advanced Production Engineering (APE) Jan 2013-
Engineering and Technology Institute Groningen (ENTEG),
Faculty of Science and Engineering (FSE),
University of Groningen (UG), Groningen, the Netherlands

Research Tribology and lubrication, multiscale contact mechanics, mechanical design, renewable (ocean) energy, biomechanics; published 27 peer-reviewed papers (including 9 during PhD) and gave >35 presentations

Teaching Course coordinator for Multiscale Contact Mechanics and Tribology (Master) and Computer Aided Design and Manufacturing (Bachelor); contributing FEM content to Materials Science and Engineering course

Supervision Supervising and co-supervising 2+2 Postdoctoral researchers and 3+3 PhD students, respectively; graduated 1 PhD student, >20 Master and >20 Bachelor students; number of projects performed in collaboration with industrial partners such as *Philips Drachten*, *Tata Steel Ijmuiden* and *Fuji Electric Malaysia*

Administration Industrial Engineering and Management (IEM) Programme (PC) and Evaluation Committees (EC)
2. Visiting Professor Sep 2017
Guest expert in computational mechanics with experience in molecular dynamics hosted by Prof. M. Paggi in the Multi-Scale Analysis of Materials (MUSAM) lab of the IMT School for Advanced Studies Lucca, Lucca, Italy
3. Visiting Researcher (Unsalariated Position) Oct-Dec 2012
Preliminary molecular dynamics work in the group of Prof. D.N. Theodorou, Department of Materials Science and Engineering, School of Chemical Engineering, National Technical University of Athens (NTUA), Athens, Greece
4. Researcher Sep 2010- Aug 2012
Research towards PhD as an FP7 Young Researchers of Cyprus Program (PENEK) scholar with Prof. C.N. Hadjicostis, Department of Electrical and Computer Engineering (ECE), University of Cyprus (UCy), Nicosia, Cyprus
5. Research Assistant Sep 2005- Dec 2011
Research for PhD on nanoscale interface mechanics (Jun 2008-Dec 2011) with Prof. A.A. Polycarpou and MSc on biomechanics (Sep 2005-May 2008) with Prof. X. Zhang, Department of Mechanical Science and Engineering (MechSE), University of Illinois at Urbana-Champaign (Uillinois), Urbana, IL, USA
6. Special Scientist Jul-Aug 2010
Equipment review and selection for the Controls Laboratory of Prof. C.N. Hadjicostis, Department of Electrical and Computer Engineering, University of Cyprus, Nicosia, Cyprus

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| 7. | <u>Teaching Fellow (Instructor)</u>
Coordination, design, teaching and grading of required junior-level course
Mechanical Design II, Department of Mechanical Science and Engineering,
University of Illinois at Urbana-Champaign, Urbana, IL, USA | Jan-Jun
2009 |
| 8. | <u>Teaching Assistant</u>
Teaching CAD/FEM computer labs and fluid laboratory labs, and grading for the
Signal Processing course, Department of Mechanical Science and Engineering,
University of Illinois at Urbana-Champaign, Urbana, IL, USA | Sep 2005-
Dec 2010 |

Education

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| 1. | <u>PhD in Mechanical Engineering</u>
Department of Mechanical Science and Engineering, University of Illinois at
Urbana-Champaign, Urbana, IL, USA

<i>Dissertation</i> Nanoscale interface mechanics with application to
magnetic storage (Advisor: Prof. A.A. Polycarpou) | Jun 2008-
Dec 2011 |
| 2. | <u>MSc in Mechanical Engineering</u>
Department of Mechanical Science and Engineering, University of Illinois at
Urbana-Champaign, Urbana, IL, USA

<i>Thesis</i> Two-dimensional biomechanical analysis of the
extremely fast strikes of trap-jaw ant mandibles | Sep 2005-
May 2008 |
| 3. | <u>BSc in Mechanical Engineering (Summa Cum Laude)</u>
Department of Mechanical and Industrial Engineering (MIE), New Jersey
Institute of Technology (NJIT), Newark, NJ, USA

<i>Senior Project</i> Bulk material transporter – Track-stair | Sep 2002-
May 2005 |
| 4. | <u>Diploma of Technician Engineer in Mechanical Engineering</u>
Mechanical and Marine Engineering Department, Higher Technical Institute
(HTI), Nicosia, Cyprus

<i>Diploma Project</i> Product visualization techniques with computers | Sep 1997-
Jun 2000 |

Awards

Grants, Fellowships and Scholarships

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| 1. | <u>Visiting Professorship at IMT School for Advanced Studies Lucca: €2,890</u>
Guest expert in computational mechanics with experience in molecular
dynamics at the IMT School for Advanced Studies Lucca | Sep 2017 |
| 2. | <u>ITEA3 VMAP Project: €323,200 (as Principal Investigator, PI)</u>
Funding for a postdoctoral position to create interoperable definitions for virtual
material models in Computer Aided Engineering (CAE), as part of a 32-member
consortium across 6 European countries for the ITEA3 proposal “VMAP: A new
Interface Standard for Integrated Virtual Material Modelling in Manufacturing
Industry” (sub-project budget: €646,400; total award: ~€16 million)
Postdoc: <i>S. Solhjo</i> | Sep 2017 |
| 3. | <u>Groningen Engineering Center (GEC) Workshop: €1,000</u>
Funding to organize a workshop within the GEC of the University of Groningen
to bring together consortium/network members and new experts on renewable
energy for the Ocean Grazer project; in coordination with Prof. B. Jayawardhana | Jul 2017 |

4. Lorentz Workshop “Micro/Nanoscale Models for Tribology”: €28,530 Apr 2016-
Funding provided by the Lorentz Center (€18,530), the Royal Netherlands Feb 2017
Academy of Arts and Sciences (KNAW, €6,000), the Materials Innovation
Institute (M2i, €2,000 secured by L. Nicola), the Groningen University Fund
(GUF, €1,000) and Nanovea (€1,000) for a workshop Lorentz Center@Oort
workshop held in Leiden, the Netherlands (30 Jan to 3 Feb 2017), co-organized
with M. Ciavarella, A. Fasolino, L. Nicola, J. Scheibert and V.A. Yastrebov with
the participation of some 60 leading tribologists from 12 European countries
5. Northern Netherlands: RoSF Project: €138,400 (as Principal Investigator, PI) Mar 2016
Funding for a PhD position on the bonding strength of metal-polymer interfaces
shared with Prof. A.H. van den Boogaard of the University of Twente (UT), the
Netherlands, as part of a consortium for the Region of Smart Factories project
(sub-project budget: €285,000; total award: ~€21 million)
PhD Student: *R. Toljaga*
6. zSpace for Enhanced 3D Image Application in Education: €28,400 Sep 2015
Joint proposal with the University Medical Center Groningen (UMCG) to deploy
a 3D desktop tool to enable the visualization of virtual prototypes for education
(total award: ~€85,000)
7. Startup Grant at the University of Groningen: €50,000 Jan 2013
Standard startup package offered to new tenure-track staff of the Faculty of
Science and Engineering; the startup package also includes one 4-year PhD
position (total award: ~€255,000)
PhD Student: *S. Solhjo*
8. FP7 Young Researchers of Cyprus Program (PENEK): €69,980 Sep 2010-
Grant funded by the European Commission (FP7) and administered by the Aug 2012
Research Promotion Foundation (RPF) of Cyprus between the Universities of
Illinois and Cyprus, designed to facilitate the integration of young researchers
into European academia
9. Teaching Fellow Award at the University of Illinois: \$2,500 Jan-May
Department of Mechanical Science and Engineering Alumni Association 2009
fellowship awarded to graduate students to independently teach a course as
instructors for one semester
10. Fulbright Cyprus-America Scholarship Program (CASP): \$65,250 Sep 2002-
Scholarship awarded to Cypriot citizens to study in the USA; used for Bachelor May 2005
study at the New Jersey Institute of Technology

Other Awards

1. Industrial Engineering and Management (IEM) Teacher of the Year Finalist Jun 2017
Voted in the top 2 teachers of the IEM program for academic year 2016-17
2. Poster Award (3rd place) Oct 2011
Student Poster Competition at International Joint Tribology Conference (IJTC),
Los Angeles, CA, USA
3. Highest Cumulative GPA Award May 2005
Department of Mechanical and Industrial Engineering, New Jersey Institute of
Technology, Newark, NJ, USA
4. Senior Project Award May 2005
Department of Mechanical and Industrial Engineering, New Jersey Institute of
Technology, Newark, NJ, USA

Publications

Google Scholar (Scopus) Citation Report

Citations 234 (170)
h-index 8 (8)

Peer-Reviewed Journal Articles

1. Mokkafer, T., P. van Rijn, A.I. Vakis & Y.T. Pei, *Crystal growth mechanism of calcium phosphate coatings on titanium by electrochemical deposition*, Surface and Coatings Technology (IF 2.589), 2017 (Accepted)
2. Müser, M.H., W.B. Dapp, R. Bugnicourt, P. Sainsot, N. Lesaffre, T.A. Lubrecht, B.N.J. Persson, K. Harris, A. Bennett, K. Schulze, S. Rohde, P. Ifju, W. G. Sawyer, T. Angelini, H. Ashtari Esfahani, M. Kadkhodaei, S. Akbarzadeh, J.-J. Wu, G. Vorlauffer, A. Vernes, S. Solhjoo, A.I. Vakis, R.L. Jackson, Y. Xu, J. Streater, A. Rostami, D. Dini, S. Medina, G. Carbone, F. Bottiglione, L. Afferrante, J. Monti, L. Pastewka, M.O. Robbins & J.A. Greenwood, *Meeting the Contact-Mechanics Challenge*, Tribology Letters (IF 1.758), 2017, 65(4), DOI: 10.1007/s11249-017-0900-2
3. Song, H., A.I. Vakis, X. Liu & E. van der Giessen, *Statistical model of rough surface contact accounting for size dependent plasticity and asperity interaction*, Journal of the Mechanics and Physics of Solids (IF 3.875), 2017, 106, DOI: 10.1016/j.jmps.2017.05.014
4. Solhjoo, S. & A.I. Vakis, *Surface roughness of gold substrates at the nanoscale: an atomistic simulation study*, Tribology International (IF 2.259), 2017, 115, DOI: 10.1016/j.triboint.2017.05.024
5. Wei, Y., J.J. Barradas-Berglind, M. van Rooij, W.A. Prins, B. Jayawardhana & A.I. Vakis, *Investigating the Adaptability of the Multi-Pump Multi-Piston Power Take-Off System for a Novel Wave Energy Converter*, Renewable Energy (IF 3.404), 2017, 111, DOI: 10.1016/j.renene.2017.04.042
6. Solhjoo, S., A.I. Vakis & Y.T. Pei, *Two phenomenological models to predict the single peak flow stress curves up to the peak during hot deformation*, Mechanics of Materials (IF 2.636), 2017, 105, DOI: 10.1016/j.mechmat.2016.12.001
7. Solhjoo, S. & A.I. Vakis, *Continuum mechanics at the atomic scale: Insights into non-adhesive contacts using molecular dynamics simulations*, Journal of Applied Physics (IF 2.101), 2016, 120(21), DOI: 10.1063/1.4967795
8. Vakis, A.I. & J.S. Anagnostopoulos, *Mechanical design and modeling of a single-piston pump for the novel power take-off system of a wave energy converter*, Renewable Energy (IF 3.404), 2016, 96(Part A), DOI:10.1016/j.renene.2016.04.076
9. Solhjoo, S. & A.I. Vakis, *Definition and detection of contact in atomistic simulations*, Computational Materials Science (IF 2.086), 2015, 109, DOI:10.1016/j.commatsci.2015.07.026
10. Solhjoo, S. & A.I. Vakis, *Single asperity nanocontacts: comparison between molecular dynamics simulations and continuum mechanics models*, Computational Materials Science (IF 2.086), 2015, 99, DOI:10.1016/j.commatsci.2014.12.010

11. Chowdhury, S., A.I. Vakis & A.A. Polycarpou, *Optimization of molecularly thin lubricant to improve bearing capacity at the head-disk interface*, *Microsystem Technologies* (IF 0.974), 2015, 21(7), DOI:10.1007/s00542-014-2364-8
12. Vakis, A.I., *Asperity interaction and substrate deformation in statistical summation models of contact between rough surfaces*, *Journal of Applied Mechanics* (IF 1.394), 2014, 81(4), DOI:10.1115/1.4025413 &
Song, H., E. van der Giessen & A.I. Vakis, *Erratum: Asperity Interaction and Substrate Deformation in Statistical Summation Models of Contact Between Rough Surfaces [Journal of Applied Mechanics, 2014, 81(4), pp. 041012]*, *Journal of Applied Mechanics* (IF 1.394), 2016, 83(8), DOI:10.1115/1.4033534
13. Vakis, A.I. & A.A. Polycarpou, *An advanced rough surface continuum-based contact and sliding model in the presence of molecularly thin lubricant*, *Tribology Letters* (IF 1.758), 2013, 49(1), DOI:10.1007/s11249-012-0060-3
14. Vakis, A.I. & A.A. Polycarpou, *Passive vibration absorption for extremely high density recording*, *IEEE Transactions on Magnetics* (IF 1.277), 2012, 48(11), DOI:10.1109/TMAG.2012.2195479
15. Vakis, A.I., C.N. Hadjicostis & A.A. Polycarpou, *Three-DOF dynamic model with lubricant contact for thermal fly-height control nanotechnology*, *Journal of Physics D: Applied Physics* (IF 2.772), 2012, 45(13), DOI:10.1088/0022-3727/45/13/135402
16. Vakis, A.I. & A.A. Polycarpou, *Modeling sliding contact of rough surfaces with molecularly thin lubricants*, *Tribology Letters* (IF 1.758), 2012, 45(1), DOI:10.1007/s11249-011-9863-x
17. Vakis, A.I., M. Eriten & A.A. Polycarpou, *Modeling bearing and shear forces in molecularly thin lubricants*, *Tribology Letters* (IF 1.758), 2011, 41(3), DOI:10.1007/s11249-010-9736-8
18. Vakis, A.I. & A.A. Polycarpou, *Head-disk interface nanotribology for Tbit/in² recording densities: near-contact and contact recording*, *Journal of Physics D: Applied Physics* (IF 2.772), 2010, 43(22), DOI:10.1088/0022-3727/43/22/225301
19. Vakis, A.I. & A.A. Polycarpou, *Optimization of thermal fly-height control slider geometry for Tbit/in² recording*, *Microsystem Technologies* (IF 0.974), 2010, 16(6), DOI:10.1007/s00542-010-1081-1
20. Vakis, A.I., S.-C. Lee & A.A. Polycarpou, *Dynamic head-disk interface instabilities with friction for light contact (surfing) recording*, *IEEE Transactions on Magnetics* (IF 1.277), 2009, 45(11), DOI:10.1109/TMAG.2009.2029410
21. Spagna, J.C., A.I. Vakis, C.A. Schmidt, S.N. Patek, X. Zhang, N.D. Tsutsui & A.V. Suarez, *Phylogeny, scaling, and the generation of extreme forces in trap-jaw ants*, *Journal of Experimental Biology* (IF 2.914), 2008, 211(14), DOI:10.1242/jeb.015263

Peer-Reviewed Conference Papers

1. Wei, Y., J.J. Barradas-Berglind, M. van Rooij, W.A. Prins, B. Jayawardhana & A.I. Vakis, *A Frequency-Domain Model for a Novel Wave Energy Converter*, EWTEC 2017, Cork, Ireland, 27 August-2 September 2017
2. Barradas-Berglind, J.J., M. Munoz-Arias, Y. Wei, W.A. Prins, A.I. Vakis & B. Jayawardhana, *Towards Ocean Grazer's Modular Power Take-Off System Modelling: a Port-Hamiltonian Approach*, IFAC 2017 World Congress, Toulouse, France, 9-14 July 2017 (Invited paper)

3. Dijkstra, H.T., J.J. Barradas-Berglind, H. Meijer, M. van Rooij, W.A. Prins, A.I. Vakis & B. Jayawardhana, *Revenue Optimization for the Ocean Grazer Wave Energy Converter through Storage Utilization*, RENEW 2016 Conference, Lisbon, Portugal, 24-28 October 2016
4. Barradas-Berglind, J.J., H. Meijer, M. van Rooij, S. Clemente Piñol, B. Galván García, W.A. Prins, A.I. Vakis & B. Jayawardhana, *Energy Capture Optimization for an Adaptive Wave Energy Converter*, RENEW 2016 Conference, Lisbon, Portugal, 24-28 October 2016
5. Solhjoo, S. & A.I. Vakis, *Molecular dynamics simulations of rough contact with fractal and statistical surface generation*, ASME 2014 12th Biennial Conference on Engineering Systems Design and Analysis (ESDA), Copenhagen, Denmark, 25-27 June 2014, DOI:10.1115/ESDA2014-20107
6. Vakis, A.I., H. Meijer & W.A. Prins, *First steps in the design and construction of the Ocean Grazer*, ASME 2014 12th Biennial Conference on Engineering Systems Design and Analysis (ESDA), Copenhagen, Denmark, 25-27 June 2014, DOI:10.1115/ESDA2014-20108
7. Vakis, A.I., S.-C. Lee & A.A. Polycarpou, *Dynamic contact with friction of an ultra-low flying head-disk interface with thermal protrusion*, Asia-Pacific Magnetic Recording Conference (APMRC), Singapore, 14-16 January 2009, DOI:10.1109/APMRC.2009.4925390

Conference (Extended) Abstracts

1. Brenes-Casasola, J., M. Muñoz-Arias, J.J. Barradas-Berglind, W.A. Prins, A.I. Vakis & B. Jayawardhana, *Energy Extraction Analysis of the Ocean Grazer WEC via Digital Particle Image Velocimetry*, 36th Benelux Meeting on Systems and Control, Spa, Belgium, 28-30 March 2017
2. Barradas-Berglind, J.J., M. Muñoz-Arias, Y. Wei, W.A. Prins, A.I. Vakis & B. Jayawardhana, *Energy-based Modeling of the Ocean Grazer Power Take-off System*, 36th Benelux Meeting on Systems and Control, Spa, Belgium, 28-30 March 2017
3. Mokabber, T., P. van Rijn, A.I. Vakis & Y.T. Pei, *Adhesion of cells on synthesized hydroxyapatite coatings with different morphologies*, Netherlands Society for Biomaterials and Tissue Engineering (NBTE) 25th Annual Meeting, Lunteren, the Netherlands, 1-2 December 2016
4. Solhjoo, S. & A.I. Vakis, *The Area of Contact for Non-Adhesive Rough Surfaces: Comparison between MD and Persson's Model*, Multiscale Materials Modelling (MMM) 2016, Dijon, France, 9-14 October 2016
5. Solhjoo, S. & A.I. Vakis, *Lubricated normal and sliding contact of fractal rough surfaces at the atomic scale*, COSTnanoTribo Conference, Istanbul, Turkey, 22-26 June 2015
6. van Rooij, M., H. Meijer, W.A. Prins & A.I. Vakis, *Experimental performance evaluation and validation of dynamical contact models of the Ocean Grazer*, MTS/IEEE Oceans15, Genoa, Italy, 18-21 May 2015, DOI:10.1109/OCEANS-Genova.2015.7271552
7. Solhjoo, S. & A.I. Vakis, *Normal contacts of lubricated fractal rough surfaces at the atomic scale*, TriboUK 2015, Loughborough, UK, 16-17 April 2015
8. Vakis, A.I., M. Eriten & A.A. Polycarpou, *Molecularly thin lubricant layer contact model accounting for interfacial slip*, ASME/STLE International Joint Tribology Conference (IJTC), San Francisco, CA, 17-20 October 2010, DOI:10.1115/IJTC2010-41249
9. Vakis, A.I. & A.A. Polycarpou, *Nanoscale mechanics for extremely high density recording*, Hellenic Society for Theoretical and Applied Mechanics (HSTAM) International Congress on Mechanics, Limassol, Cyprus, 12-14 July 2010

10. Zhang, X., K. Li & A.I. Vakis, *Biological inspiration from dynamic modeling of human hand and trap-jaw ant mandible movements*, Journal of Biomechanics (IF 2.431), 2007, 40: p. S79, DOI:10.1016/S0021-9290(07)70076-3
11. Spagna, J.C., S.N. Patek, A.I. Vakis & A.V. Suarez, *Extreme forces and jaw size variation in trap-jaw ants*, Integrative and Comparable Biology, 2006, 46: p. E134-E134

Professional Articles

1. Vakis, A.I. & A.A. Polycarpou, *Dynamic adhesive contact with molecularly thin lubricant at the head-disk interface of hard disk drives*, STLE's Official Membership Magazine, TLT (Tribology & Lubrication Technology), 2012 (Invited paper)

Under Review

1. Vakis, A.I., V.A. Yastrebov, J. Scheibert, L. Nicola, C. Minfray, A. Almqvist, M. Paggi, S. Lee, G. Limbert, J.F. Molinari, G. Anciaux, S. Echeverri Restrepo, A. Papangelo, A. Cammarata, P. Nicolini, R. Aghababei, C. Putignano, S. Stupkiewicz, J. Lengiewicz, G. Costagliola, F. Bosia, R. Guarino, N.M. Pugno, G. Carbone, D. Dini, M.H. Müser & M. Ciavarella, *Models and Methods for Tribology Across Scales: an Overview*, Tribology International (IF 2.259), 2017 (Invited paper)
2. Y. Wei, J.J. Barradas-Berglind, Z. Yu, M. van Rooij, W.A. Prins, B. Jayawardhana & A.I. Vakis, *Frequency-Domain Hydrodynamic Modelling of Dense and Sparse Arrays of Wave Energy Converters*, Renewable Energy (IF 3.404), 2017

Under Preparation

1. Huisman, J.N.B., S. Solhjo, Y.T. Pei & A.I. Vakis, *Roughness generation for single and polycrystalline materials*, Journal TBD
2. Kamps, M., S. Solhjo & A.I. Vakis, *Molecular dynamics investigations of flows in nano-channels*, Journal TBD
3. Halbertsma, P.J., S. Solhjo, M. Veldhuis, R. Toljaga, Y.T. Pei & A.I. Vakis, *Free surface roughness evolution of AISI 420 steel during uniaxial plastic deformation and Erichsen cupping test: comparative study*, Journal TBD
4. Wei, Y., J.J. Barradas-Berglind, Z. Yu, M. van Rooij, W.A. Prins, B. Jayawardhana & A.I. Vakis, *Nonlinear frequency domain model of hydraulic piston pumps*, Journal TBD

Presentations

Invited Talks

1. *The Ocean Grazer Project: Hybrid Renewable Energy Extraction and Storage*, Joint NWO-MOST Joint Seminar, National Cheng Kung University (NCKU), Tainan, Taiwan, November 2017
2. *Classical Molecular Dynamics as a Tool for Tribology and Beyond*, IMT School for Advanced Studies Lucca, Lucca, Italy, September 2017
3. *Ocean Grazer: a Novel Ocean Energy Extraction and Storage Device*, IMT School for Advanced Studies Lucca, Lucca, Italy, September 2017
4. *How education should look like in 2030*, Industrial Engineering and Management (IEM) First Year Symposium, Groningen, the Netherlands, June 2017

5. *Engineering the Ocean Grazer*, Industrial Engineering and Management (IEM) student association TBV Lugus-ENTEG meeting 2017, Groningen, the Netherlands, February 2017
6. *Advanced Production Engineering: Research overview and 3D printing roadmap*, Innovation Cluster Drachten (ICD), Drachten, the Netherlands, May 2016
7. *Tribology across scales as a bridge between science and engineering*, Engineering and Technology Institute Groningen Seminar Series, Faculty of Science and Engineering, University of Groningen, Groningen, the Netherlands, April 2015
8. *Design, analysis and optimization of the core technology for a novel wave energy converter*, Department of Mechanical and Manufacturing Engineering, University of Cyprus, Nicosia, Cyprus, January 2015
9. *Multi-scale tribology: from nanocontacts to wave energy harvesters*, Precision and Microsystems Engineering (PME) Department, Faculty of Mechanical, Maritime and Materials Engineering (3ME), Technical University Delft, Delft, the Netherlands, December 2014
10. *Modeling rough contact in the presence of molecularly thin lubricant films*, Department of Materials Science and Engineering, National Technical University of Athens, Athens, Greece, November 2012
11. *Multiscale interface mechanics and its applications*, Mechanical Engineering Department, Khalifa University, Abu Dhabi, UAE, September 2012
12. *Design and analysis of dynamical interfaces at the nanoscale*, Institute of Technology and Management, University of Groningen, Groningen, the Netherlands, June 2012
13. *Interface mechanics and dynamics in nanotechnology*, Mechanical Engineering Department, McGill University, Montreal, Canada, May 2012
14. *Passive vibration absorption for extremely high density recording*, Dynamics Interest Group (DIG) Seminar, Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, Urbana, IL, May 2012

Conference and Other Talks

1. Presented by J.J. Barradas-Berglind: *Towards Ocean Grazer's Modular Power Take-Off System Modelling: a Port-Hamiltonian Approach*, IFAC 2017 World Congress, Toulouse, France, 9-14 July 2017
2. Presented by J.J. Barradas-Berglind: *Energy Extraction Analysis of the Ocean Grazer WEC via Digital Particle Image Velocimetry*, 36th Benelux Meeting on Systems and Control, Spa, Belgium, March 2017
3. Presented by J.J. Barradas-Berglind: *Energy-based Modeling of the Ocean Grazer Power Take-off System*, 36th Benelux Meeting on Systems and Control, Spa, Belgium, March 2017
4. Presented by T. Mokabber: *Adhesion of cells on synthesized hydroxyapatite coatings with different morphologies*, NBTE Annual Meeting, Lunteren, the Netherlands, December 2016
5. Presented by J.J. Barradas-Berglind: *Revenue Optimization for the Ocean Grazer WEC through Storage Utilization*, RENEW 2016, Lisbon, Portugal, October 2016
6. Presented by J.J. Barradas-Berglind: *Energy Capture Optimization for an Adaptive Wave Energy Converter*, RENEW 2016, Lisbon, Portugal, October 2016

7. Presented by S. Solhjoo: *The Area of Contact for Non-Adhesive Rough Surfaces: Comparison between MD and Persson's Model*, MMM 2016, Dijon, France, October 2016
8. Presented by S. Solhjoo: *Nanotribology: Molecular Dynamics Simulation Approach*, ENTEG Autumn Meeting 2015, Haren, the Netherlands, October 2015
9. Presented by S. Solhjoo: *Lubricated normal and sliding contact of fractal rough surfaces at the atomic scale*, COSTnanoTribo Conference, Istanbul, Turkey, June 2015
10. *Experimental performance evaluation and validation of dynamical contact models of the Ocean Grazer*, MTS/IEEE Oceans15, Genoa, Italy, May 2015
11. Presented by S. Solhjoo: *Normal contacts of lubricated fractal rough surfaces at the atomic scale*, TriboUK 2015, Loughborough, UK, April 2015
12. *First steps in the design and construction of the Ocean Grazer*, ASME 2014 12th Biennial Conference on Engineering Systems Design and Analysis (ESDA), Copenhagen, Denmark, June 2014
13. *Molecular dynamics simulation of rough contact with fractal and statistical surface generation*, ASME 2014 12th Biennial Conference on Engineering Systems Design and Analysis (ESDA), Copenhagen, Denmark, June 2014
14. *Modeling asperity interaction*, DPTA/SMS group presentation, University of Groningen, Groningen, the Netherlands, May 2013
15. *Nanoscale modeling of hard disk drive design for ultrahigh recording densities* (as part of PENEK grant requirements), University of Cyprus, Nicosia, Cyprus, July 2012
16. *Sliding contact between rough surfaces in the presence of molecularly thin lubricant layers*, Surface Science and Technology, Department of Materials, ETH Zürich, Switzerland, December 2011
17. *Nanoscale interface mechanics with application to magnetic storage*, Institute of Robotics and Intelligent Systems (IRIS), ETH Zürich, Switzerland, December 2011
18. *Rough surface sliding contact in the presence of molecularly thin lubricant*, ASME/STLE International Joint Tribology Conference (IJTC), Los Angeles, CA, October 2011
19. *Molecularly thin lubricant layer contact model accounting for interfacial slip*, ASME/STLE International Joint Tribology Conference, San Francisco, CA, October 2010
20. *Modeling molecularly thin lubricant forces at the head-disk interface*, Information Storage Industry Consortium (INSIC) Annual Meeting, EHDR Program, Milpitas, CA, August 2010
21. *Tribodynamics of extremely high density recording*, Recruiting Presentation at the University of Illinois at Urbana-Champaign, Urbana, IL, March 2010
22. *Tbit/in² recording densities in magnetic storage: issues at the head-disk interface*, Nanohour Series at the Beckman Institute, University of Illinois at Urbana-Champaign, Urbana, IL, January 2010
23. *Optimization of TFC slider geometry and the effect of disk deformations due to air bearing stiffening during flight*, Information Storage Industry Consortium Annual Meeting, EHDR Program, Santa Clara, CA, August 2009
24. *Towards 10 Tbit/in² of storage density: optimization of HDD design with respect to TFC geometry for flying and surfing recording*, University of Cyprus, Nicosia, Cyprus, June 2009

Posters

1. Presented by T. Mokabber: *Crystal growth mechanism of calcium phosphate coatings on titanium by electrochemical deposition*, ENTEG Autumn Meeting 2017, Haren, the Netherlands, October 2017
2. Presented by R. Toljaga: *Multi-scale bonding strength of direct-joined polymer-metal interfaces*, ENTEG Autumn Meeting 2017, Haren, the Netherlands, October 2017
3. Presented by M.Z. Almuzakki: *Optimal Control of a Point Absorber Wave Energy Converter: A Fourier-Galerkin Approach*, ENTEG Autumn Meeting 2017, Haren, the Netherlands, October 2017
4. Presented by R. Wang: *On the dynamics of a taut cable and its PTO system*, ENTEG Autumn Meeting 2017, Haren, the Netherlands, October 2017
5. Presented by S. Solhjo: *Atomic scale roughness of gold substrates*, Lorentz workshop on Micro/Nanoscale Models for Tribology, Leiden, then Netherlands, January 2017
6. Presented by S. Solhjo: *Continuum contact mechanics theories at the atomic scale: an investigation of non-adhesive contacts*, Lorentz workshop on Micro/Nanoscale Models for Tribology, Leiden, then Netherlands, January 2017
7. Presented by J. Li: *Prediction of solubility for thermo-responsive comb polymers*, ENTEG Autumn Meeting 2016, Haren, the Netherlands, October 2016
8. Presented by T. Mokabber: *Synthesizing hydroxyapatite coatings for medical applications*, ENTEG Autumn Meeting 2016, Haren, the Netherlands, October 2016
9. Presented by S. Solhjo: *Non-adhesive contacts: the application of continuum theories at the atomic scale*, ENTEG Autumn Meeting 2016, Haren, the Netherlands, October 2016
10. Presented by R. Toljaga: *Bonding strength of deforming metal-polymer interfaces*, ENTEG Autumn Meeting 2016, Haren, the Netherlands, October 2016
11. Presented by S. Solhjo: *Nanotribology: Molecular Dynamics Simulation Approach*, ENTEG Autumn Meeting 2015, Haren, the Netherlands, October 2015
12. Presented by S. Solhjo: *Dry sliding contact between fractal and statistical rough surfaces at the atomic scale*, FOM@Veldhoven, Veldhoven, the Netherlands, January 2015 &
DGM European Symposium on Friction, Wear and Wear Protection, Karlsruhe, Germany, May 2014
13. *Passive vibration absorption for extremely high density recording*, IEEE International Magnetism Conference (INTERMAG), Vancouver, Canada, May 2012
14. *3-DOF model of magnetic storage head-disk interface for use with adhesive contact model with friction*, ASME/STLE International Joint Tribology Conference, Los Angeles, CA, October 2011
15. *Modeling molecularly thin lubricant forces in magnetic storage*, ASME/STLE International Joint Tribology Conference, San Francisco, CA, October 2010
16. *Assessment of dynamic contact conditions and optimization of TFC slider geometry for Tbit/in² recording densities*, ASME/STLE International Joint Tribology Conference, Memphis, TN, October 2009

Teaching

Master Courses

1. Multiscale Contact Mechanics and Tribology Feb 2015-
Course coordinator and lecturer of elective course in the Industrial Engineering and Management (IEM) Advanced Production Engineering (APE) specialization

Bachelor Courses

1. Computer Aided Design and Manufacturing (CAD/CAM) Nov 2013-
Course coordinator and lecturer of compulsory 3rd year course for the IEM Production Technology and Logistics (PTL) track
2. Materials Science and Engineering (Course coordinator: Prof. B.J. Kooi) Oct 2013-
Lecturer of Finite Element Method (FEM) content of compulsory 2nd year course for the IEM PTL track

Supervision

The following industrial partners have participated in past and ongoing PhD and Master projects: *Philips Drachten, Tata Steel Ijmuiden, Thales Netherlands, BD Kiestra, Leapfrog 3D Printers, Henkel Nederland B.V. and Fuji Electric Malaysia*

Postdoc Projects

1. S. Solhjoo Oct 2017-
A new Interface Standard for Integrated Virtual Material Modelling in Manufacturing Industry
Postdoc project funded via RvO ITEA3 “VMAP” proposal
2. Y. Wei Jun 2016-
Hydrodynamics of the Ocean Grazer
Postdoc project funded by the University of Groningen

Postdoc Project Co-supervision

1. A.M. Kamat (Main supervisor: Prof. Y.T. Pei) Aug 2017-
Laser Additive Manufacturing of Conformal Cooling Systems
Postdoc project funded via STW HTM “ProTOcool” proposal
2. J.J. Barradas-Berglind (Main supervisor: Prof. B. Jayawardhana) Dec 2015-
Mechatronics of the Ocean Grazer
Postdoc project funded by the University of Groningen

PhD Projects

1. R. Wang (Promotor: Prof. B. Jayawardhana) Jun 2017-
Design and optimization of the Ocean Grazer platform
PhD project funded by a full scholarship from the University of Groningen
2. R. Toljaga (Promotor: Prof. A.H. van den Boogaard, University of Twente) Sep 2016-
Bonding strength of deforming metal-polymer interfaces
PhD project funded via SNN “Region of Smart Factories (RoSF)” proposal
3. J. Li (Promotor: Prof. F. Picchioni) Oct 2015-
Modeling of thermally reversible interactions in polymeric systems
PhD project funded by the Chinese Scholarship Council (CSC)

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|----|---|-----------------------|
| 4. | S. Solhjoo (Promotor: Prof. Y.T. Pei)
<i>Nanotribology investigations with classical molecular dynamics</i>
PhD project funded by the University of Groningen | Sep 2013-
Jul 2017 |
|----|---|-----------------------|

PhD Project Co-supervision

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|----|--|-----------|
| 1. | M. Guo (Promotor: Prof. B. Jayawardhana)
<i>Control system of a novel coupling mechanism for the Ocean Grazer Power Take-Off system</i>
PhD project funded by the Chinese Scholarship Council (CSC) | Oct 2017- |
| 2. | M.Z. Almuzakki (Promotor: Prof. B. Jayawardhana)
<i>Dynamical modeling and optimal distributed control design of the Ocean Grazer's floater blanket</i>
PhD project funded by the Indonesia Endowment Fund for Education | Oct 2016- |
| 3. | T. Mokabber (Promotor: Prof. Y.T. Pei; co-promotor: Assist. Prof. P. van Rijn)
<i>Synthesizing antibacterial hydroxyapatite coatings for medical applications</i> | Oct 2015- |

PhD Committee Participation

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|----|---|----------|
| 1. | P. Cinat (Defense Committee; supervisor: Prof. M. Paggi, IMT Lucca, Italy)
<i>Modeling of roughness across scales using a novel methodology</i> | Feb 2018 |
| 2. | H. Song (Examining Committee; promotor: Prof. E. van der Giessen, ZIAM)
<i>Size-dependent plasticity in contact/friction: from discrete dislocation dynamics inside an asperity to statistical summation over asperities</i> | Nov 2016 |

Master Research Projects

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|----|--|-----------------------|
| 1. | M. Kamps
<i>Molecular dynamics simulation of polymeric flow on atomically flat and rough surfaces</i> | Oct 2016-
Jul 2017 |
| 2. | A. van Driel
<i>Development of the activation mechanism for the Ocean Grazer</i> | Oct 2016-
Jun 2017 |
| 3. | R.J.M. Zwetsloot
<i>Hydrodynamical analysis of the Ocean Grazer platform</i> | Oct 2016-
Jun 2017 |
| 4. | Z. Yu
<i>Hydrodynamic analysis of the floater blanket in the frequency domain</i> | Oct 2016-
Apr 2017 |
| 5. | O.J. Strack van Schijndel
<i>Visualization of mechanical constraints of the Antikythera Mechanism</i> | Oct 2016-
Apr 2017 |
| 6. | P. Begemann
<i>Validation of a simulation model for ductile fracture</i> | Oct 2016-
Apr 2017 |
| 7. | J.N.B. Huisman
<i>The effect of crystal structure on surface roughness at the nanoscale</i> | Mar 2016-
Feb 2017 |
| 8. | O. van Hees
<i>The design of a sealing system for the Ocean Grazer</i> | Oct 2015-
Jul 2016 |
| 9. | M.R. Hegge
<i>The redesign of the transportation track within the Total Lab Automation system of BD Kiestra</i> | Sep 2015-
Jul 2016 |

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| 10. | M.A. Hassink
<i>Design of experimental measurements to obtain performance characteristics of a multiple ball check valve</i> | Oct 2015-
Jun 2016 |
| 11. | P.J. Halbertsma
<i>Free surface roughening due to multi-stage cold forming</i> | Oct 2015-
Apr 2016 |
| 12. | H.J. Houtsma
<i>Design of a station keeping system for the Ocean Grazer</i> | Dec 2014-
Dec 2015 |
| 13. | R.W. de Groene
<i>Friction experiments and simulations to model the hot forging process at Henkel Scheemda</i> | Feb 2015-
Sep 2015 |
| 14. | D. ter Veen
<i>Optimization of 3D printing for the APE group</i> | Sep 2014-
Jun 2015 |
| 15. | L.J.P. Evers
<i>Designing a transmission system for the Ocean Grazer</i> | Sep 2014-
May 2015 |
| 16. | A. Cruz Gispert (Erasmus)
<i>Analysis and dynamical modeling of a piston valve for a wave energy converter</i> | Sep 2014-
Apr 2015 |
| 17. | B. Ammerlaan
<i>The effect of media substrate topography on the carbon coating coverage: a Molecular Dynamics study at Fuji Electric</i> | Jan 2014-
Mar 2015 |
| 18. | M. van Rooij
<i>Experimental validation of dynamical contact models of the Ocean Grazer</i> | Mar 2014-
Feb 2015 |
| 19. | H. Meijer
<i>Simulation of a piston-type hydraulic pump for the Ocean Grazer</i> | Sep 2013-
Dec 2014 |
| 20. | E.J. Heslinga
<i>Evaluating lubricant pick-up testing methods for media disks at Fuji Electric Malaysia</i> | Apr 2013-
Oct 2014 |

Master Research Project Co-supervision

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|----|--|-----------------------|
| 1. | G. Martí Manresa (Erasmus; first supervisor: Prof. B. Jayawardhana)
<i>Analysis and comparison of wave energy extraction in the Ocean Grazer's wave tank experimental setup</i> | Feb-Sep
2017 |
| 2. | A. Fernández Vuelta (Erasmus; first supervisor: Prof. B. Jayawardhana)
<i>Modular modelling for the Power Take-Off system of a Wave Energy Converter</i> | Feb-Sep
2017 |
| 3. | A.S. Ratum (First supervisor: Prof. B. Jayawardhana)
<i>Dynamical modeling and control of the Ocean Grazer WEC turbine subsystem</i> | Oct 2016-
Jul 2017 |
| 4. | P. Papangelos (First supervisor: Prof. B. Jayawardhana)
<i>2D force measurement on a bicycle ergometer</i> | Apr 2015-
Jun 2017 |
| 5. | W. van Zanten (First supervisor: dr. A.A. Geertsema)
<i>The Antikythera Mechanism</i> | Mar 2016-
Apr 2017 |

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| 6. | J. Franke (First supervisor: Prof. E.J. Stamhuis, ESRIG)
<i>An experimental approach to create an efficient and non-clogging solid-liquid separation method using biomimetics</i> | Sep 2015-
Mar 2017 |
| 7. | N. Schriever (First supervisor: Prof. Y.T. Pei)
<i>Nanoporous materials for sulfur-based cathodes of high-energy-density lithium-sulfur batteries</i> | Mar 2016-
Jan 2017 |
| 8. | C. Verhoef (First supervisor: Prof. B. Jayawardhana)
<i>Estimating and predicting the ocean surface with radar data</i> | Oct 2015-
Sep 2016 |
| 9. | W. Wierenga (First supervisor: Prof. J. Post)
<i>Evaluation of the MSC Adams co-simulation interface for metal working processes</i> | Nov 2015-
Jul 2016 |
| 10. | H.T. Dijkstra (First supervisor: Prof. B. Jayawardhana)
<i>Maximizing revenue of electricity generated by the Ocean Grazer</i> | Oct 2015-
Jul 2016 |
| 11. | E. Heidstra (First supervisor: Prof. Y.T. Pei)
<i>Improving the filament extrusion performance and reliability of the Leapfrog Creatr Pro 3D printer</i> | Oct 2015-
Apr 2016 |
| 12. | S. Clemente Piñol (Erasmus; first supervisor: Prof. B. Jayawardhana)
<i>Dynamical modeling, analysis and optimization of a floater blanket</i> | Sep 2014-
May 2015 |
| 13. | D.A. Botterweg (First supervisor: Prof. Y.T. Pei)
<i>The design of a check valve for the Ocean Grazer</i> | Mar 2014-
Feb 2015 |
| 14. | B. Galván García (Erasmus; first supervisor: Prof. B. Jayawardhana)
<i>Nonlinear control design for a wave energy converter</i> | Mar 2014-
Aug 2014 |

Other Master Projects (Business, Design, etc.)

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|----|--|-----------------------|
| 1. | O.J. Strack van Schijndel
Designing a TEVAR delivery system | May-Nov
2017 |
| 2. | L. van Tilburg (IEM Design Project; first supervisor: dr. A.A. Geertsema)
<i>The design of two new quantitative wrinkle measurement methods to measure during and after ironing</i> | Dec 2016-
Sep 2017 |
| 3. | K. van Ek (Science, Business and Policy; first supervisor: dr. J. Kosinka, JBI)
<i>Single-material 3D printed objects with varying flexibility</i> | Feb 2017-
Jul 2017 |
| 4. | E.M. de Ruiter (IEM Design Project; first supervisor: dr. H. Kloosterman)
<i>Improving the campaign life of the pot hardware in the continuous galvanizing lines at Tata Steel IJmuiden</i> | Nov 2016-
Mar 2017 |
| 5. | B.J.D. Hallo (IEM Business Project)
<i>Feasibility study of small-scale production of filament for 3D printing</i> | May 2015-
Oct 2015 |

Bachelor Projects

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|----|---|-----------------------|
| 1. | R. Bos
<i>The Ocean Grazer floater blanket as an inflatable mattress concept</i> | Feb 2017-
Jun 2017 |
| 2. | A. Miocevic
<i>Ocean Grazer: external platform structure</i> | Feb 2017-
Jun 2017 |

3. J.P. Nienhuis Feb 2017-
Jun 2017
Preliminary study on modelling interfacial behavior in a metal-polymer interface using COMSOL Multiphysics
4. N. de Vries Feb 2017-
Jun 2017
Interactive 3D models via Unity for education
5. J.E. Bos Feb 2017-
Jun 2017
The Antikythera mechanism – From the sea to 3D: Virtual Greek astronomy and engineering
6. M.J.J Bögels Sep 2016-
Jan 2017
Validating floater blanket models for the Ocean Grazer
7. R.M. Nienhuis Sep 2016-
Jan 2017
The Antikythera mechanism: using the past to shape the future
8. S. Vreriks Feb 2016-
Jun 2016
Empirical research on multi-chamber Oscillating Water Columns
9. M.R.A. Visser Feb 2016-
Jun 2016
Wave tank experiments on the prototype of the floater blanket
10. P. van den Berg Feb 2016-
Jun 2016
Optimal turbine for a varying head and flow in the Ocean Grazer
11. R. Zaharia Sep 2015-
Jan 2016
Added value of an Oscillating Water Column
12. S. Gupta (Erasmus) Aug-Dec
2015
A feasibility study of the application of a piston ring system for the piston-type hydraulic pump system in the Ocean Grazer
13. T. Herwig Feb 2015-
Jun 2015
Creating a structural design for the floater elements for the Ocean Grazer
14. N. Hartsuiker Feb 2015-
Jun 2015
Conversion of hydraulic head into electrical energy in the Ocean Grazer
15. O.J. Strack van Schijndel Feb 2015-
Jun 2015
Determining the amount of floater members of the Ocean Grazer
16. J.S. van der Molen Feb 2015-
Jun 2015
Creating a better data management system for the Ocean Grazer group
17. W. van Zanter Sep 2014-
Jan 2015
Researching the floater-piston connection of the Ocean Grazer
18. M. Kamps Sep 2014-
Jan 2015
Validating a surface roughness model using FEM
19. J. Welink Feb-Jul
2014
Creating a scale model for the Ocean Grazer
20. W. Wierenga Feb-Jul
2014
Designing and testing a nonlinear energy sink applied to the Ocean Grazer

Bachelor Project Co-supervision

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|--|-----------------------|
| 1. R. Popa (Astronomy; first supervisor: Prof. M.A.M. v.d. Weijgaert, Kapteyn)
<i>Visualization of the Antikythera Mechanisms's Planetarium</i> | Mar 2017-
Jul 2017 |
| 2. F. Kernkamp (Applied Physics; first Supervisor: Prof. P. Onck, ZIAM)
<i>Contact modelling of patterned liquid crystal polymer coatings</i> | Aug 2015-
May 2016 |

Other

Membership in Professional Societies

1. IEEE, the Institute of Electrical and Electronics Engineers
2. STLE, the Society of Tribologists and Lubrication Engineers
3. ASME, the American Society of Mechanical Engineers
4. EOTEK, the Scientific and Technical Chamber of Cyprus
5. Tau Beta Pi (NJ Gamma), the National Engineering Honor Society
6. Pi Tau Sigma (Tau Theta), the International Mechanical Engineering Honor Society

Academic Service

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|---|-----------------------|
| 1. <u>Member</u> of the new Mechanical Engineering master program's Admission Committee; participant in curriculum development activities since 2016 | Sep 2018- |
| 2. <u>Chair</u> of Industrial Engineering and Management (IEM) Programme Committee (PC) at the University of Groningen | Sep 2016- |
| 3. <u>Co-organizer and co-chair</u> with M. Ciavarella, A. Fasolino, L. Nicola, J. Scheibert and V.A. Yastrebov of a Lorentz Workshop on "Micro/Nanoscale Models for Tribology" held in Leiden, the Netherlands, from 30 January to 3 February 2017 | Apr 2016-
Feb 2017 |
| 4. <u>Member</u> of Industrial Engineering and Management (IEM) Programme Committee's Evaluation Committee (EC) at the University of Groningen | Sep 2014-
Jul 2016 |
| 5. <u>Teacher</u> of workshop on Computer Aided Design for Cover, the Student Association of Computing Science and Artificial Intelligence at University of Groningen | Sep 2014 |
| 6. <u>Co-organizer and co-administrator</u> (with Drs. W.A. Prins) of the Ocean Grazer Group comprising staff members and students working on the Ocean Grazer project at the University of Groningen | Sep 2014- |
| 7. <u>Reviewer</u> for the National Research Foundation of South Africa | Aug 2014 |
| 8. <u>Supervisor of student groups</u> performing literature research for Industrial Engineering and Management Integrated Design Project, a compulsory 1 st year course in the IEM Production Technology and Logistics (PTL) track | Apr 2014 |
| 9. <u>Member</u> of Industrial Engineering and Management (IEM) Programme Committee (PC) at the University of Groningen | Sep 2013-
Jul 2016 |
| 10. <u>Organizer of seminar series</u> on magnetic storage tribology at the Electrical and Computer Engineering Department of the University of Cyprus as part of the requirements for the PENEK grant | Jun 2012 |

11. Reviewer for a number of journals in the fields of:

Sep 2009-

- › Tribology and lubrication (Tribology International, Tribology Letters, Journal of Tribology, Journal of Engineering Tribology, Tribology Transactions);
- › Applied mechanics, materials science and applied physics (Journal of Applied Mechanics, Meccanica, Computational Materials Science, International Journal of Solids and Structures, Journal of Adhesion Science and Technology, Journal of Applied Physics);
- › Manufacturing and mechanical engineering (Journal of Micro- and Nano-Manufacturing, International Journal of Precision Engineering and Manufacturing-Green Technology, Journal of Hydraulic Engineering); and
- › Renewable energy (Ocean Engineering)