

## Dr EMMANUEL BROUSSEAU

### Reader (Associate Professor)

**Work address** Cardiff School of Engineering  
Cardiff University  
Queens' buildings  
The Parade, Newport Road  
Cardiff CF23 4AA  
UK

**Home address** 6 Reardon Smith Court  
Cardiff CF5 3JD  
UK

**Email** BrousseauE@cf.ac.uk  
**Telephone** +44 (0)2920875752

**Date of birth** 07/07/77  
**Nationality** French

### SUMMARY

I am a Reader (equivalent to (Associate Professor) at Cardiff School of Engineering. My current research interest lies in the field of advanced manufacturing technologies with a specific expertise in nano 'mechanical' machining (AFM probe-based) and micro 'thermal' machining (laser-based). I obtained my PhD at Cardiff University in the area of intelligent CAD/CAM in 2005. Prior to my first appointment as a Lecturer in 2012, I was the recipient of a five-year Academic Fellowship from the Research Councils UK. Since 2005, I have published over 90 scientific peer-reviewed papers (including 52 journal papers), principally in the area of micro and nano manufacturing. In 2011, I received the Outstanding Young Manufacturing Engineer Award from the Society of Manufacturing Engineers. I have secured, as Principal Investigator (PI), research income for a total value of £540k. This includes two EPSRC Grants (EP/I012133/1 and EP/M020703/1). Following the departure of a senior colleague from the School in 2011, I was subsequently invited to act as PI for two FP7 projects (MULTILAYER and POLARIC), which together were worth £1.0m. I have also been Co-Investigator on research programmes totalling £1.1m, which comprise two EPSRC grants (EP/F056745/1 and EP/K031635/1) and one EU project (ECOLASERFACT). I am currently Associate Editor for the peer-reviewed scientific journal Manufacturing Letters.

### RESEARCH GRANTS

- |                    |   |
|--------------------|---|
| <b>2017</b>        | <b>Principal Investigator.</b> Cardiff University Research Infrastructure Fund. Transmission Electron Microscopy (TEM) Instrumentation. Value: £51,732.   |
| <b>2016</b>        | <b>Principal Investigator.</b> MRC. Feasibility of optimising corona discharge surface activation of polystyrene micro wells to increase production efficiency and performance of in vitro clinical diagnostic tests. Value: £13,741. |
| <b>2015 - 2018</b> | <b>Principal Investigator.</b> EPSRC. Novel Instrumentation for High-Speed AFM-based Nano Machining (EP/M020703/1). Value: £314,172.  |
| <b>2014 - 2016</b> | <b>Principal Investigator.</b> Welsh Government Ser Cymru NRN scheme. Selective modification of the microstructure of bulk metallic glass materials through pulsed laser processing. Value: £69,997.                                  |
| <b>2012 - 2015</b> | Co-Investigator. ERDF. Efficient laser technology factories of the future (ECOLASERFACT). Value: £123,091.  |
| <b>2012 - 2013</b> | Co-Investigator. EPSRC: Small items of research equipment at Cardiff University (EP/K031635/1). Value: £498,293.  |
| <b>2011 - 2014</b> | (Invited) <b>Principal Investigator.</b> EC FP7: Printable, organic and large-area realisation of   |

integrated circuits (POLARIC). Value: £753,027.

- 2011 - 2012**      **Principal Investigator.** Engineering and Physical Sciences Research Council (EPSRC). 1<sup>st</sup> Grant Scheme (EP/I012133/1). NanoTooling. Value: £98,995.
- 2010 - 2015**      Co-Investigator. ERDF. Advanced Sustainable Manufacturing Technologies (ASTUTE). Value: £1,903,117.
- 2008 - 2012**      Co-Investigator. EPSRC. Access to Nanoscience and Nanotechnology Equipment at Cardiff (EP/F056745/1). Value: £526,757.
- 2008 - 2012**      (Invited) **Principal Investigator.** EC FP7: Rolled multi material layered 3D shaping technology (MULTILAYER). Value: £251,580.
- 2008**              **Principal Investigator.** Royal Academy of Engineering. Distinguished Visiting Fellowship award to invite Professor Sergej Fatikow from Oldenburg University, Germany, for a duration of 4 weeks at the Manufacturing Engineering Centre, Cardiff University. Value: £4,860.
- 2007 - 2009**      Co-Investigator. British Council. British German Academic Research Collaboration programme. A novel Solution for 3D tactile micro-measurements. Value: £2,200.

## EDUCATION

- 2000 - 2004**      **PhD – Intelligent techniques for automatic feature recognition in CAD models**  
Manufacturing Engineering Centre (MEC), Cardiff University  
Supervisor: Professor Stefan Dimov  
The thesis focused on the development of a hybrid method to build Automatic Feature Recognition (AFR) systems that could be applied in different application domains. For this, inductive learning techniques were employed to automatically generate the knowledge base of AFR systems. Then, this knowledge base was applied together with geometric reasoning algorithms to determine the feature structure of 3D CAD models. The proposed method was implemented and tested in a prototype system for recognising machining features from benchmark solid models.
- 1999 - 2000**      French degree in CAD/CAM – Fifth year of studies after A levels – DESS (Diplôme d'Etudes Supérieures Spécialisées) – Conception et Fabrication Assistées par Ordinateur. Ecole Nationale d'Ingénieurs de Tarbes (France)
- 1998 - 1999**      French degree in Mechanical Engineering – Fourth year of studies after A levels – Equivalent to a MEng. University of Nantes (France)
- 1997 - 1998**      French degree in Mechanical Engineering – Third year of studies after A levels – Equivalent to a BEng. University of Nantes (France)

## EMPLOYMENT

- 2017 - present**    **Reader** – Cardiff School of Engineering, Cardiff University, UK.
- 2014 - 2017**      **Senior Lecturer** – Cardiff School of Engineering, Cardiff University, UK.
- 2012 - 2014**      **Lecturer** – Cardiff School of Engineering, Cardiff University, UK.
- 2007 - 2012**      **RCUK Academic Fellow** – Cardiff School of Engineering, Cardiff University, UK.
- 2005 - 2007**      **Post doctoral Research Fellow** – Manufacturing Engineering Centre (MEC), Cardiff University, UK.

## EXPERIENCE of POSTGRADUATE RESEARCH STUDENT SUPERVISION

<b>2018 - present</b>	Shen Hao. PhD topic: "A Novel Modelling Approach to Enhance the Predictability of Nano-scale Mechanical Machining". Percentage supervision: 45%.
<b>2018 - present</b>	Sameeh Baquain. PhD topic: "High Frequency Tip-based Nano-machining". Percentage supervision: 40%.
<b>2017 - present</b>	Yang Jiao. PhD topic: "Laser Micromachining of Bulk Metallic Glasses". Percentage supervision: 60%.
<b>2015 - present</b>	Josh Jones. PhD topic: "High-throughput AFM-Based Nano Machining for Applications in Nano Magnetism". Percentage supervision: 50%.
<b>2014 - 2017</b>	Raheem Al-Musawi. PhD thesis: "Theoretical and Experimental Investigations about the AFM Tip-Based Nanomachining Process". Percentage supervision: 60%.
<b>2013 - 2017</b>	Zaynab Alraziqi. PhD thesis: "Express Analysis of Actual Bluntness of AFM Probe Tips". Percentage supervision: 50%.
<b>2012 - 2017</b>	Nur Farah Mukhtar. PhD thesis: "Characterisation of Tip Wear during AFM Probe-Based Nanomachining". Percentage supervision: 90%.
<b>2013 - 2016</b>	Haithem Ismail Elderrat. PhD thesis: "Study of a Novel Material Solution for Vibration Isolation". Percentage supervision: 20%.
<b>2011 - 2015</b>	Eleri Williams. PhD thesis: "Experimental and Theoretical Investigations of Nanosecond Fibre Laser Micromachining". Percentage supervision: 90%.
<b>2011 - 2013</b>	Fuad Omar. PhD thesis: "Hot Embossing Process Parameters: Simulation and Experimental Studies". Percentage supervision: 90%.
<b>2011 - 2013</b>	Oludare Adebayo Williams. PhD thesis: "Beyond Lean: a Framework for Fit Production Systems". Percentage supervision: 10%.
<b>2011 - 2013</b>	Baris Yuce. PhD thesis: "Novel Computational Technique for Determining Depth Using the Bees Algorithm and Blind Image Deconvolution". Percentage supervision: 10%.
<b>2011 - 2013</b>	Mario Gonzalez Romo. PhD thesis: "Manipulation of Nanoparticles by Pushing Operations Using an Atomic Force Microscope (AFM)". Percentage supervision: 10%.

## UNDERGRADUATE TEACHING EXPERIENCE

<b>2016 - present</b>	- EN1090 "Engineering Analysis" - Year 1 (BEng/MEng). <u>Module Leader</u>
<b>2016 - present</b>	- EN4110 "Mechatronics" - Year 4 (MEng).
<b>2010 - present</b>	- EN1048 "Engineering Applications" - Year 1 (BEng/MEng).
<b>2010 - present</b>	- EN3100 "Project" - Year 3 (BEng/MEng).
<b>2014 - 2016</b>	- ENT302 "Research Study" - MSc Professional Engineering. <u>Module Leader</u>
<b>2013 - 2016</b>	- EN2024 "Mechanical Laboratories" - Year 2 (BEng/MEng). <u>Module Leader</u>
<b>2014 - 2015</b>	- ENT537 "Materials and their Properties" - MSc Orthopaedics Engineering.

- 2011 - 2015** - EN1090 “Engineering Analysis” - Year 1 (BEng/MEng).
- 2010 - 2014** - EN4101 “Automotive Design” - Year 4 (MEng).

#### ADMINISTRATIVE and LEADERSHIP RESPONSIBILITIES

- 2018 - present** **Head of International Engagement for the Mechanical Engineering Department** at Cardiff School of Engineering.
- 2016 - 2018** **Deputy leader of the High Value Manufacturing group** (leader: Prof Rossi Setchi) at Cardiff School of Engineering.
- 2016 - 2018** **Chair of the Athena Swan Action Group** on Website Development at Cardiff School of Engineering.
- 2015 - 2018** **Member of the Athena Swan Self-Assessment Panel** at Cardiff School of Engineering.
- 2013 - 2018** **Year 2 tutor.** Mechanical and Medical Engineering degree programmes at Cardiff School of Engineering.
- 2010 - present** **Lab manager and health & safety responsible.** Metrology and Micro Manufacturing laboratories at Cardiff School of Engineering.

#### PUBLICATIONS - Journals

- 1) Jiao Y., **Brousseau E.B.**, Han Q., Zhu H. and Bigot S. Investigations in nanosecond laser micromachining on the  $Zr_{52.8}Cu_{17.6}Ni_{14.8}Al_{9.9}Ti_{4.9}$  bulk metallic glass: experimental and theoretical study. [Journal of Materials Processing Technology](#). Vol. 273, **2019**, 116232 (13 pages), DOI: 10.1016/j.jmatprotec.2019.05.013
- 2) Borodich F.M., **Brousseau E.B.**, Clarke A., Pepelyshev A. and Sánchez-López J.C. Roughness of deposited carbon-based coatings and its statistical characteristics at nano and microscales. [Frontiers in Mechanical Engineering](#). Vol. 5, **2019**, article 24 (13 pages). DOI: 10.3389/fmech.2019.00024
- 3) Kumar D., Stoichkov V., **Brousseau E.B.**, Smith G.C. and Kettle J. High performing AgNWs transparent conducting electrodes with 2.5Ω/Sq based upon roll-to-roll compatible post processing technique. [Nanoscale](#). Vol. 11, **2019**, pp. 5760-5769. DOI: 10.1039/c8nr07974a.
- 4) Giasin K., Gorey G., Byrne C., Sinke J., **Brousseau E.B.** Effect of machining parameters and cutting tool coating on hole quality in dry drilling of fibre metal laminates. [Composite Structures](#), Vol. 212, **2019**, pp. 159-174. DOI: 10.1016/j.compstruct.2019.01.023.
- 5) Geng Y., Yan Y., Wang J., **Brousseau E.B.**, Sun Y. and Sun Y. Fabrication of periodic nanostructures using AFM tip-based nanomachining: combining groove and material pile-up topographies. [Engineering](#), Vol. 4(6), **2018**, pp. 787-795. DOI: 10.1016/j.eng.2018.09.010.
- 6) Mandal S., Thomas E.L.H., Gines L., Morgan D., Green J., **Brousseau E.B.** and Williams O.A. Redox agent enhanced chemical mechanical polishing of thin film diamond. [Carbon](#), Vol. 130, **2018**, pp. 25-30. DOI: 10.1016/j.carbon.2017.12.077.
- 7) Geng Y., **Brousseau E.B.**, Zhao X., Gensheimer M. and Bowen C.R. AFM tip-based nanomachining with increased cutting speed at the tool-workpiece interface. [Precision Engineering](#), Vol. 51, **2018**, pp. 536-544. DOI: doi.org/10.1016/j.precisioneng.2017.10.009.
- 8) He Y., Yan Y.D., Geng Y. and **Brousseau E.B.** Fabrication of periodic nanostructures using dynamic plowing lithography with the tip of an atomic force microscope. [Applied Surface Science](#), Vol. 427, **2018**, pp. 1076-

1083. DOI: 10.1016/j.apsusc.2017.08.134.

- 9) Vella P.C., Dimov S.S., Minev E. and **Brousseau E.B.** Technology maturity assessment of micro and nano manufacturing processes and process chains. [Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering Manufacture](#). Vol. 232(8) , **2018**, 1362-1383. DOI: 10.1177/0954405416668922.
- 10) Werrell J.M., Mandal S., Thomas E.L.H., **Brousseau E.B.**, Lewis R., Borri P., Davies P.R. and Williams O.A. Effect of slurry composition on the chemical mechanical polishing of thin diamond films. [Science and Technology of Advanced Materials](#). Vol. 18 (1), **2017**, pp. 654-663. DOI: 10.1080/14686996.2017.1366815..
- 11) **Brousseau E.B.**, Thierry S., Arnal B., Nyiri E., Gibaru O. and Mayor J.R. A computer-aided design and manufacturing implementation of the atomic force microscope tip-based nanomachining process for two-dimensional patterning. [ASME Transactions, Journal of Micro and Nano-Manufacturing](#). Vol. 5 (4), **2017**, 041003 (5 pages). DOI: doi:10.1115/1.4037694.
- 12) Geng Y., Yan Y., **Brousseau E.B.** and Y. Sun. AFM tip-based mechanical nanomachining of 3D micro and nano-structures via the control of the scratching trajectory. [Journal of Materials Processing Technology](#), Vol. 248, **2017**, pp. 236-248. DOI: 10.1016/j.jmatprotec.2017.05.028.
- 13) Ulmeanu M., Petkov P., Ursescu D., Jipa F., Harniman R., **Brousseau E.** and Ashfold M. N. R. Substrate surface patterning by optical near field modulation around colloidal particles immersed in a liquid. [Optics Express](#), Vol. 24(24), **2016**, pp. 27340-27351. DOI: 10.1364/OE.24.027340.
- 14) Geng Y., Yan Y., **Brousseau E.B.**, Cui X., Yu B., Zhao X. and Hu Z. Machining complex three-dimensional nanostructures with an atomic force microscope through the frequency control of the tip reciprocating motions. [ASME Transactions, Journal of Manufacturing Science and Engineering](#), Vol. 138(12), **2016**, 124501 (8 pages). DOI: 10.1115/1.4034892.
- 15) Al-Musawi R.S.J., **Brousseau E.B.**, Geng Y. and Borodich F.M. Insight into mechanics of AFM tip-based nanomachining: bending of cantilevers and machined grooves. [Nanotechnology](#), Vol. 27(38), **2016**, 385302 (14 pages). DOI: 10.1088/0957-4484/27/38/385302.
- 16) Geng Y., Yan Y., **Brousseau E.B.**, Yu B., Qu S., Hu Z. and Zhao X. Processing outcomes of the AFM probe-based machining approach with different feed directions. [Precision Engineering](#), Vol. 46, **2016**, pp 288-300. DOI: 10.1016/j.precisioneng.2016.05.009.
- 17) Ding Z., Stoichkov V., Horie M., **Brousseau E.** and Kettle J. Spray coated silver nanowires as transparent electrodes in OPVs for Building Integrated Photovoltaics applications. [Solar Energy Materials & Solar Cells](#), Vol. 157, **2016**, pp 305-311. DOI: 10.1016/j.solmat.2016.05.053.
- 18) Williams E. and **Brousseau E.B.** Nanosecond laser processing of  $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10}Be_{22.5}$  with single pulses. [Journal of Materials Processing Technology](#), Vol. 232, **2016**, pp 34-42. DOI: 10.1016/j.jmatprotec.2016.01.023.
- 19) Williams E. and **Brousseau E.B.** Simulation and experimental study of nanosecond laser micromachining of commercially pure titanium. [ASME Transactions, Journal of Micro and Nano-Manufacturing](#), Vol. 4 (1), **2016**, 011004 (9 pages). DOI: 10.1115/1.4031892.
- 20) **Brousseau E.B.**, Al-Musawi R., and Lebiez D. A hybrid roll-to-roll AFM set-up for high throughput tip-based nano-machining. [Manufacturing Letters](#), Vol. 6, **2015**, pp 10-13. DOI: 10.1016/j.mfglet.2015.11.002.
- 21) Ulmeanu M., Petkov P., Ursescu D., Maraloiu A., Jipa F., **Brousseau E.** and Ashfold M. N. R. Pattern formation on silicon by laser-initiated liquid-assisted colloidal lithography. [Nanotechnology](#), Vol. 26 (45), **2015**, 455303 (9 pages), DOI: 10.1088/0957-4484/26/45/455303.
- 22) Lynch C., Richards C., Dorrington P., **Brousseau E.** and Turner M. Measurement of forces from epidural catheter insertion. [Anaesthesia](#), Vol. 70 (10), **2015**, pp 1215–1216, DOI: 10.1111/anae.13214.
- 23) Prokopovich P., Kobrick M., **Brousseau E.B.** and Perni S. Potent antimicrobial activity of bone cement

encapsulating silver nanoparticles capped with oleic acid. [Journal of Biomedical Materials Research: Part B - Applied Biomaterials](#), Vol. 103 (2), **2015**, pp 273-281, DOI:10.1002/jbm.b.33196.

- 24) Vella P.C., Dimov S.S., **Brousseau E.B.** and Whiteside B.R. A new process chain for producing bulk metallic glass replication masters with micro- and nano-scale features. [International Journal of Advanced Manufacturing Technology](#), Vol. 76 (1-4), **2015**, pp 523-543, DOI: 10.1007/s00170-014-6148-1.
- 25) Elderrat H., Davies, H. and **Brousseau E.** Investigation of the foam filled fluid technology for anti-vibration devices. [International Journal of Structural Analysis & Design](#), Vol. 1 (3), **2014**, pp. 182-187.
- 26) Thomas E.L.H., Mandal S., **Brousseau E.B.**, Williams O.A. Silica based polishing of {100} and {111} single crystal diamond. [Science and Technology of Advanced Materials](#), Vol. 15 (3), **2014**, 035013 (7 pages), DOI: 10.1088/1468-6996/15/3/035013.
- 27) Williams E., **Brousseau E.B.** and Rees A. Nanosecond Yb fibre laser milling of aluminium: effect of process parameters on the achievable surface finish and machining efficiency. [International Journal of Advanced Manufacturing Technology](#), Vol. 74 (5-8), **2014**, pp 769-780, DOI: 10.1007/s00170-014-6038-6.
- 28) Preedy E., **Brousseau E.B.**, Evans S., Perni S. and Prokopovich P. Adhesive forces and surface properties of cold gas plasma treated UHMWPE. [Colloids and Surfaces A: Physicochemical and Engineering Aspects](#), Vol. 460, **2014**, pp 83-89, DOI: 10.1016/j.colsurfa.2014.03.052
- 29) Omar F., **Brousseau E.B.**, Elkaseer A.M., Kolew A., Prokopovich P. and Dimov S. Development and experimental validation of an analytical model to predict the demoulding force in hot embossing. [Journal of Micromechanics and Microengineering](#), Vol. 24 (5), **2014**, 055007 (11 pages), DOI: 10.1088/0960-1317/24/5/055007.
- 30) Ulmeanu M., Petkov P., Hirshy H., **Brousseau E.B.** Formation of ordered arrays of Si and GaAs nanostructures by single-shot laser irradiation in near-field at the solid/liquid interface. [Materials Research Express](#), Vol. 1 (1), **2014**, 015030 (9 pages), DOI:10.1088/2053-1591/1/1/015030.
- 31) Elkaseer A.M. and **Brousseau E.B.** Modelling the surface generation process during AFM probe-based machining: simulation and experimental validation. [Surface Topography: Metrology & Properties](#), Vol. 2 (2), **2014**, 025001 (12 pages), DOI:10.1088/2051-672X/2/2/025001.
- 32) Islam N. and **Brousseau E.B.** Implementing a multi-staged methodology to micro and nanotechnology: Technology maturity assessment and framework. [International Journal of Productivity and Performance Management](#), Vol. 63 (2), **2014**, pp. 170-193, DOI: 10.1108/IJPPM-01-2013-0010.
- 33) Hashoosh A., Hirshy H., **Brousseau E.** and Moosa A. Fabrication of aluminium nanowires by differential pressure injection. [ISRN Nanomaterials](#), Vol. 2013, **2013**, Article ID 132798 (5 pages), DOI: 10.1155/2013/132798.
- 34) Omar F., Kolew A., **Brousseau E.B.** and Hirshy H. Simulation and experimental study of the effects of process factors on the uniformity of the residual layer thickness in hot embossing. [ASME Transactions, Journal of Micro and Nano-Manufacturing](#), Vol. 1 (2), **2013**, 021002 (10 pages), DOI: 10.1115/1.4024097
- 35) Kettle J., Rees A., **Brousseau E.B.** and Horie M. Low temperature thermal nanoimprint lithography of anti-reflective structures for flexible low band gap organic solar cells. [Journal of Physics D: Applied Physics](#), Vol. 46 (10), **2013**, 105102 (6 pages), DOI: <http://dx.doi.org/10.1088/0022-3727/46/10/105102>
- 36) Rees A., **Brousseau E.B.**, Dimov S.S., Bigot S. and Griffiths C.A. Development of surface roughness optimisation and prediction for the process of wire electro discharge grinding. [International Journal of Advanced Manufacturing Technology](#), Vol. 64 (9-12), **2013**, pp. 1395-1410, ISSN: 02683768, DOI: <http://dx.doi.org/10.1007/s00170-012-4110-7>
- 37) Dimov S.S., **Brousseau E.B.**, Minev R. and Bigot S. Micro- and nano-manufacturing: Challenges and opportunities. [Proceedings of the Institution of Mechanical Engineers, Part C, Journal of Mechanical Engineering Science](#), Vol. 226 (C1), **2012**, pp. 3-15, DOI: <http://dx.doi.org/10.1177/0954406211422972>

- 38) Scholz S.G., Griffiths C.A., Dimov S.S., **Brousseau E.**, Lalev G., Petkov P. Manufacturing routes for replicating micro and nano surface structures with bio-mimetic applications. [CIRP Journal of Manufacturing Science and Technology](#), Vol. 4 (4), **2011**, pp. 347-356. DOI: <http://dx.doi.org/10.1016/j.cirpj.2011.05.004>
- 39) **Brousseau E.B.** and Eldukhri E. Recent advances on key technologies for innovative manufacturing. [Journal of Intelligent Manufacturing](#), Vol. 22 (5), **2011**, pp. 675-691, DOI: [10.1007/s10845-009-0328-0](http://dx.doi.org/10.1007/s10845-009-0328-0).
- 40) **Brousseau E.B.**, Krohs F., Caillaud E., Dimov S., Gibaru O. and Fatikow S. Development of a novel process chain based on Atomic Force Microscopy scratching for small and medium series production of polymer nano structured components. [ASME Transactions, Journal of Manufacturing Science and Engineering](#), Vol. 132 (3), **2010**, 030901 (8 pages), ISSN 1087-1357, DOI: <http://dx.doi.org/10.1115/1.4001481>.
- 41) **Brousseau E.B.**, Dimov S.S. and Pham D.T. Some recent advances in multi-material micro- and nano-manufacturing. [International Journal of Advanced Manufacturing Technology](#), Vol. 47 (1-4), **2010**, pp. 161-180, ISSN 0268-3768, DOI: <http://dx.doi.org/10.1007/s00170-009-2214-5>.
- 42) Ferri C., Faraway J. and **Brousseau E.** Calibration of a white light interferometer for the measurement of micro-scale dimensions. [International Journal of Advanced Manufacturing Technology](#), Vol. 47 (1-4), **2010**, pp. 125-135, ISSN 0268-3768, DOI: <http://dx.doi.org/10.1007/s00170-009-2050-7>.
- 43) Griffiths C.A., Bigot S., **Brousseau E.**, Worgull M., Hecke M., Nestler J. and Auerswald J. Investigation of polymer inserts as prototyping tooling for micro injection moulding. [International Journal of Advanced Manufacturing Technology](#), Vol. 47 (1-4), **2010**, pp. 111-123, ISSN 0268-3768, DOI: <http://dx.doi.org/10.1007/s00170-009-2038-3>.
- 44) Griffiths C.A., Dimov S.S., **Brousseau E.B.**, Chouquet C., Gavillet J. and Bigot S. Investigation of surface treatment effects in micro-injection-moulding. [International Journal of Advanced Manufacturing Technology](#), Vol. 47 (1-4), **2010**, pp. 99-110, ISSN 0268-3768, DOI: <http://dx.doi.org/10.1007/s00170-009-2000-4>.
- 45) Griffiths C.A., Dimov S.S. and **Brousseau E.B.** Micro injection moulding: the influence of runner systems on flow behaviour and melt fill of multiple micro cavities. [Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering Manufacture](#), Vol. 222 (B9), **2008**, pp. 1119-1130, ISSN 0954-4054, DOI: [10.1243/09544054JEM1084](http://dx.doi.org/10.1243/09544054JEM1084).
- 46) Griffiths C.A., Dimov S.S., **Brousseau E.B.** and Packianather M.S. The finite element analysis of melt flow behaviour in micro-injection moulding. [Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering Manufacture](#), Vol. 222 (B9), **2008**, pp. 1107-1118, ISSN 0954-4054, DOI: [10.1243/09544054JEM965](http://dx.doi.org/10.1243/09544054JEM965).
- 47) Ferri C. and **Brousseau E.B.** Variability in measurements of micro lengths with a white light interferometer. [Quality and Reliability Engineering International](#), Vol. 24 (8), **2008**, pp. 881-890, ISSN 0748-8017, DOI: [10.1002/qre.903](http://dx.doi.org/10.1002/qre.903).
- 48) **Brousseau E.B.**, Dimov S.S. and Setchi R.M. Knowledge acquisition techniques for feature recognition in CAD models. [Journal of Intelligent Manufacturing](#), Vol. 19 (1), **2008**, pp. 21-32, ISSN 0956-5515, DOI: [10.1007/s10845-007-0043-7](http://dx.doi.org/10.1007/s10845-007-0043-7).
- 49) Charmeux J-F., Minev R., Dimov S., Minev E., **Brousseau E.** and Harrysson U. Benchmarking of three processes for producing castings incorporating micro/meso-scale features with a high aspect ratio. [Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering Manufacture](#), Vol. 221 (B4), **2007**, pp 577-589, ISSN 0954-4054, DOI: [10.1243/09544054JEM693](http://dx.doi.org/10.1243/09544054JEM693).
- 50) Griffiths C.A., Dimov S.S., **Brousseau E.B.** and Hoyle R.T. The effects of tool surface quality in micro injection moulding. [Journal of Materials Processing Technology](#), Vol. 189 (1-3), **2007**, pp. 418-427, ISSN 0924-0136, DOI: [10.1016/j.jmatprotec.2007.02.022](http://dx.doi.org/10.1016/j.jmatprotec.2007.02.022).
- 51) Dimov S.S., **Brousseau E.B.** and Setchi R.M., A hybrid method for feature recognition in computer-aided design models. [Proceedings of the Institution of Mechanical Engineers, Part B, Journal of Engineering](#)



- 52) Pham D.T., Dimov S.S., Setchi R.M., Peat B., Soroka A.J., **Brousseau E.B.** et al. Product lifecycle management for performance support. *ASME Journal of Computing and Information Science in Engineering*, Vol. 4, 2004, pp. 305-315, ISSN 1530-9827.

#### PUBLICATIONS - Conferences

- 1) Jones J. **Brousseau E.B.** and Read D. AFM tip-based cutting of grooves on permalloy nanowires for controlling the motion of magnetic domain walls. 2018 World Congress on Micro and Nano Manufacturing, WCMNM2018, Portorož, Slovenia, September 18-20, 2018, pp 139-142.
- 2) **Brousseau E.B.**, Geng Y., Gensheimer M. and Bowen C.R. Increasing the processing speed of AFM tip-based nanomachining at the tool-workpiece interface. 2017 World Congress on Micro and Nano Manufacturing, WCMNM2017, Kaohsiung, Taiwan, March 27-30, 2017, pp 343-346.
- 3) Williams E.R. **Brousseau E.B.** Lavery N.P. Mehraban S. Keast V.L. Hughes C.E. and Harris K.D.M. Nanosecond Laser Milling of the Amorphous Alloy  $Zr_{41.2}Ti_{13.8}Cu_{12.5}Ni_{10}Be_{22.5}$ . 11<sup>th</sup> International Conference on Multi-Material Micro Manufacture, 4M/IWMF2016, Lyngby, Denmark, September 13-15, 2016, pp. 199-202.
- 4) Alraziqi Z. Mukhtar N.F.H. and **Brousseau E.**, Comparison of two AFM probe inspection techniques for three-dimensional tip characterisation. euspen's 16th International Conference & Exhibition, Nottingham, UK, May 30 - June 03, 2016, pp. 59-60.
- 5) Al-Musawi R.S.J. and **Brousseau E.**, Influence of the mechanical behaviour of cantilevers on the topography of nano-scale grooves during AFM tip-based machining. euspen's 16th International Conference & Exhibition, Nottingham, UK, May 30 - June 03, 2016, pp. 383-384.
- 6) Packianather M.S., **Brousseau E.** and Gonzalez D.G., Effects of micro injection moulding on the mechanical properties of selected test specimen. 23rd CAPE conference, Edinburgh, UK, November 03-04, 2015.
- 7) **Brousseau E.B.**, Arnal B., Thiery S., Nyiri E. and Gibaru O., A simple and generic CAD/CAM approach for AFM probe-based machining. 11th International Conference and Exhibition on Laser Metrology, Machine Tool, CMM and Robotic Performance, LAMDA MAP 2015, Huddersfield, March 17-18, 2015, pp. 362-368.
- 8) Elderrat H., Davies, H. and **Brousseau E.** Characterisation of a Novel Foam Filled Fluid Vibration Isolator. Proceedings of the Second International Conference on Advances in Civil, Structural and Mechanical Engineering, CSM 2014, Birmingham, November 16-17, 2014, pp. 15-20.
- 9) Elderrat H., Davies, H. and **Brousseau E.** Investigation of the foam filled fluid technology for anti-vibration devices. Proceedings of the International Conference on Advances in Civil, Structural and Mechanical Engineering, CSM 2014, London, June 01-02, 2014, pp. 86-90.
- 10) Mukhtar N.F.H., **Brousseau E.B.** and Prickett P.W. Study of silicon tip wear during AFM probe-based machining of single crystal copper. Ninth International Conference on MicroManufacturing, ICOMM2014, Singapore, March 25-28, 2014.
- 11) Vella P.C., Dimov S.S., Whiteside B., **Brousseau E.B.**, Tuinea-Bobe C.L., Gant C., Minev E. and Petkov P. Validation of a new process chain for producing bulk metallic glass replication masters with micro and nano-scale features. Tenth International Conference on Multi-Material Micro Manufacture, 4M2013, San Sebastian, Spain, October 8-10, 2013, pp. 103-108.
- 12) Williams E. and **Brousseau E.B.** Single pulse nanosecond laser processing of zirconium-based bulk metallic glass. Tenth International Conference on Multi-Material Micro Manufacture, 4M2013, San Sebastian, Spain, October 8-10, 2013, pp. 152-155.
- 13) Elkaseer A.M. and **Brousseau E.B.** Surface roughness prediction in AFM probe-based machining. Tenth



International Conference on Multi-Material Micro Manufacture, 4M2013, San Sebastian, Spain, October 8-10, **2013**, pp. 97-100.

- 14) **Brousseau E.B.**, Arnal B., Thierry S., Nyiri E., Gibaru O. and Mayor J.R. Towards CNC automation in AFM probe-based nano machining. Eight International Conference on MicroManufacturing, ICOMM2013, Victoria, Canada, March 25-28, **2013**, pp. 499-506.
- 15) Omar F., Elkaseer A.M., **Brousseau E.B.**, Kolew A. and Prokopovich P. Demoulding forces in hot embossing: model development and validation. Eight International Conference on MicroManufacturing, ICOMM2013, Victoria, Canada, March 25-28, **2013**, pp. 642-649.
- 16) Omar F., Kolew A., **Brousseau E.** and Hirshy H. Process factors influence on residual layer uniformity in hot embossing. Tenth International Conference on Multi-Material Micro Manufacture, 4M2012, Vienna, Austria, October 9-11, **2012**, pp. 81-84.
- 17) Elkaseer A.M. and **Brousseau E.B.** AFM probe-based mechanical machining: modelling of the surface generation process. Seventh International Conference on MicroManufacturing, ICOMM2012, Evanston, USA, March 12-14, **2012**, pp. 78-84.
- 18) Vella P.C., Dimov S.S., **Brousseau E.B.**, Minev E., Dobrev T., Petkov P. and Velkova V. Length scale integration: implementation of a new process chain for producing replication masters with micro and nano scale features. Eighth International Conference on Multi-Material Micro Manufacture, 4M2011, Stuttgart, Germany, November 8-10, **2011**, pp. 343-347.
- 19) **Brousseau E.B.**, Scholz S. and Rees A. Fabrication of 3D structures using Atomic Force Microscopy scratching. Seventh International Conference on Multi-Material Micro Manufacture, 4M2010, Oyonnax, France, November 17-19, **2010**, pp. 65-68.
- 20) Minev R., Vella P., **Brousseau E.**, Dimov S., Minev E. and Matthews C. Methodology for capability maturity assessment of MNT chains. Seventh International Conference on Multi-Material Micro Manufacture, 4M2010, Oyonnax, France, November 17-19, **2010**, pp. 249-252.
- 21) Minev R., Vella P., **Brousseau E.**, Dimov S., Scholz S. and Matthews C. Capability maturity study of the horizontal and vertical integration of structuring, patterning and characterisation MNTs. Seventh International Conference on Multi-Material Micro Manufacture, 4M2010, Oyonnax, France, November 17-19, **2010**, pp. 253-256.
- 22) Vella P.C., **Brousseau E.B.**, Minev R. and Dimov S.S. A methodology for technology maturity assessment of micro and nano manufacturing processes and process chains. Fifth International Conference on MicroManufacturing, ICOMM/4M 2010, Madison, USA, April 5-8, **2010**, pp. 327-334.
- 23) **Brousseau E.B.**, Barton R., Dimov S., and S. Bigot. A methodology for evaluating the technological maturity of micro and nano fabrication processes. Fifth International Precision Assembly Seminar, IPAS 2010, Chamonix, France, February 14-17, **2010**, pp. 329-336.
- 24) **Brousseau E.B.**, Barton R., Dimov S. and Bigot S. Technology maturity assessment of micro and nano manufacturing processes. Fifth International Conference on Multi-Material Micro Manufacture, 4M2009, Karlsruhe, Germany, September 23-25, **2009**, pp. 257-262, DOI: 10.3850/4M2009RP001\_9051.
- 25) **Brousseau E.B.**, Krohs F., Dimov S., Griffiths C., Scholz S., Rees A. and Fatikow S. Investigation of a new process chain based on atomic force microscopy scratching. Fifth International Conference on Multi-Material Micro Manufacture, 4M2009, Karlsruhe, Germany, September 23-25, **2009**, pp. 267-270, DOI: 10.3850/4M2009RP001\_9053.
- 26) Scholz S., Petkov P., **Brousseau E.B.**, Griffiths C.A., Hirshy H. and Dimov S.S. Process chain for replicating bio inspired micro structured surfaces. Fifth International Conference on Multi-Material Micro Manufacture, 4M2009, Karlsruhe, Germany, September 23-25, **2009**, pp. 271-274, 10.3850/4M2009RP001\_9054.
- 27) Scholz S., Griffiths C.A., Dimov S.S., **Brousseau E.B.**, Lalev G. and Petkov P. New process chains for

replicating micro and nano structured surfaces with bio-mimetic applications. Society of Plastics Engineers Annual Technical Conference, ANTEC2009, Chicago, USA, June 22-24, **2009**, pp. 3021-3027.

- 28) Mattsson L., Bolt P.J., Azcarate S., **Brousseau E.** et al. How reliable are surface roughness measurements of micro-features? - Experiences of a Round Robin test within nine 4M laboratories. Fourth International Conference on Multi-Material Micro Manufacture, 4M2008, Cardiff, UK, September 09-11, **2008**, pp. 139-142, ISBN 978-1-904445-76-0.
- 29) Krohs F., Luttermann T., Stolle C., Fatikow S., **Brousseau E.** and Dimov S. Towards automation in AFM based nanomanipulation and electron beam induced deposition for microstructuring. Fourth International Conference on Multi-Material Micro Manufacture, 4M2008, Cardiff, UK, September 09-11, **2008**, pp. 118-123, ISBN 978-1-904445-76-0.
- 30) Griffiths C.A., Dimov S.S. and **Brousseau E.B.** Micro injection moulding: an experimental study on the relationship between the filling of micro parts and runner designs. Fourth International Conference on Multi-Material Micro Manufacture, 4M2008, Cardiff, UK, September 09-11, **2008**, pp. 217-220, ISBN 978-1-904445-76-0.
- 31) Griffiths C.A., Dimov S.S., **Brousseau E.B.** and Packianather M.S. Micro injection moulding: simulation of melt flow behaviour. Fourth International Conference on Multi-Material Micro Manufacture, 4M2008, Cardiff, UK, September 09-11, **2008**, pp. 267-270, ISBN 978-1-904445-76-0.
- 32) Griffiths C.A., Dimov S.S., **Brousseau E.B.**, Chouquet C., Gavillet J. and Bigot S. Micro-Injection moulding: surface treatment effects on part demoulding. Fourth International Conference on Multi-Material Micro Manufacture, 4M2008, Cardiff, UK, September 09-11, **2008**, pp. 245-248, ISBN 978-1-904445-76-0.
- 33) Rees A., **Brousseau E.B.** Dimov S.S. Gruber H. and Paganetti I. Wire electro discharge grinding: surface finish optimisation. Fourth International Conference on Multi-Material Micro Manufacture, 4M2008, Cardiff, UK, September 09-11, **2008**, pp. 233-236, ISBN 978-1-904445-76-0.
- 34) Matovic J., Kettle J., **Brousseau E.** and Adamovic N. Patterning of nanomembranes with a focused-ion-beam. 26th International Conference on Microelectronics, MIEL 2008, Nis, Serbia, May 11-14, **2008**, pp. 103-106, ISBN 978-1-4244-1881-7, DOI: 10.1109/ICMEL.2008.4559233.
- 35) Griffiths C.A., Bigot S., **Brousseau E.**, Hecke M., Nestler J. and Auerswald J. Polymer inserts tooling for prototyping of micro fluidic components in micro injection moulding. Third International Conference on Multi-Material Micro Manufacture, 4M2007, Borovets, Bulgaria, October 03-05, **2007**, pp. 305-308, ISBN 978-1904445-53-1.
- 36) Ferri C. and **Brousseau E.** Critical analysis of an existing calibration procedure built in a white light interferometer microscope and proposal of an alternative spline-based approach. Third International Conference on Multi-Material Micro Manufacture, 4M2007, Borovets, Bulgaria, October 03-05, **2007**, pp. 169-172, ISBN 978-1904445-53-1.
- 37) Pham D.T., Dimov S.S., **Brousseau E.B.** et al. Recent advances in micro and nano manufacturing. Fourth International Conference on Digital Enterprise Technology, DET2007, Bath, United Kingdom, September 19-21, **2007**, pp. 24-33, ISBN 978-0-86197-141-1.
- 38) Ferri C. and **Brousseau E.** Uncertainty contribution and effects of two setup parameters on the measurements of  $\mu$ -lengths with a white-light interferometer. Sixth International Conference on Quality, Reliability and Maintenance (QRM) 2007, Oxford, England, UK, March 22-23, **2007**, pp. 129-134, ISBN 978-901892-21-5.
- 39) Ferri C., **Brousseau E.**, Dimov S. and Mattsson L. Repeatability analysis of two methods for height measurements in the micrometer range. Second International Conference on Multi-Material Micro Manufacture, 4M2006, Grenoble, France, September 20-22, **2006**, pp. 165-168, ISBN 0-080-45263 0.
- 40) **Brousseau E.B.**, Dimov S.S. and Setchi R.M. Learning and Reasoning Techniques for Automatic Feature Recognition from CAD Models. Second I\*PROMS Virtual International Conference on Intelligent Production

- 41) Dimov S.S., **Brousseau E.B.** and Setchi R.M. Automatic formation of rules for feature recognition in solid models. First I\*PROMS Virtual International Conference on Intelligent Production Machines and Systems, IPROMS2005, July 4-15, **2005**, pp. 49-54, ISBN 0-080-44730-9.

## PROFESSIONAL ACTIVITIES and RECOGNITION

<b>Societies</b>	<b>Society of Manufacturing Engineers (SME):</b> Senior Member <b>International Institution for MicroManufacturing (I2M2):</b> Member.
<b>Honours and distinctions</b>	<b>Teaching of the Year Award</b> at Cardiff School of Engineering (2017). <b>Named as one of the three Scientific Chairs</b> for the 2017 World Congress on Micro and Nano Manufacturing, Kaohsiung, Taiwan (2017). <b>Nominated for an 'Enriching Student Life Award'</b> at Cardiff University (2016, 2018). <b>Top downloaded paper</b> and inclusion in the '2014 Article Highlights' collection for the IOP Journal 'Surface Topography: Metrology and Properties' (2014). <b>Fellow of the Higher Education Academy</b> (2013). <b>Outstanding Young Manufacturing Engineer Award</b> , SME (2011).
<b>External examiner</b>	<b>PhD and EngD theses:</b> Nottingham University (UK), Loughborough University (UK), the University of Huddersfield (UK), Swansea University (UK), the University of Franche-Comte (France), the University of Lyon (France) and the University of the Basque Country (Spain). <b>Degree programmes:</b> Aeronautical and Advanced Manufacturing degrees at Swansea University (UK): 2018 - present.
<b>Editorial board</b>	<b>Manufacturing Letters:</b> associate editor: 2019 - present. <b>Journal of Mechanical Engineering and Automation:</b> associate editor: 2012 - 2016.
<b>Guest editorial</b>	<b>International Journal of Advanced Manufacturing Technology.</b> Special Issue on Multi-Material Micro Manufacture (4M). Co-editors: Dimov S. and Menz W. (2010).
<b>Invited talks</b>	<b>2018</b> - "Implementing tip-based nano-scale machining with an AFM: lessons learned, challenges and perspectives", Tianjin University, China. Internal research seminar. <b>2015</b> - "AFM probe-based nano-machining research at Cardiff University", Harbin Institute of Technology, China. Internal research seminar. <b>2015</b> - "AFM probe-based nano-machining", Danmarks Tekniske Universitet, Denmark. Plenary speaker for the International Conference Polymer Replication on Nanoscale (PRN 2015). <b>2015</b> - "AFM probe-based nano-machining", Cambridge University, UK. Ultra Precision Manufacturing Conference 2015 organised by the EPSRC Centre in Ultra Precision. <b>2014</b> - "AFM probe-based nano-machining", Bangor University, UK. Internal research seminar. <b>2014</b> - "AFM probe-based nano-machining for surface structuring", Glyndwr University, UK. Micro Surface Structuring event organised by the EPSRC Centre in Ultra Precision. <b>2014</b> - "Single Pulse Nanosecond Laser Processing of a Zirconium-based Bulk Metallic Glass", Swansea University, UK. Showcase event: Material Characterisation for Manufacturing. <b>2014</b> - "Mechanical nano-machining performed on AFM instruments", The Institution of Engineering and Technology, South Wales Manufacturing & Management Technical Group, Cardiff, UK. <b>2011</b> - "Maskless-based micro and nano manufacturing technologies". Guest lecturer at Northwestern University, Evanston, USA. <b>2011</b> - "Challenges and opportunities in micro and nano manufacturing". Invited speaker. Institution of Mechanical Engineers, South Wales Region, Cardiff, UK. <b>2008</b> - "Tooling and Replication Technologies for Micro and Nano Scale Fabrication".

Keynote speaker at the International Symposium for Micro Manufacturing and Nano Materials, Marinha Grande, Portugal.

**2008** - "Atomic Force Microscopy". Tutorial session during the I\*PROMS Researchers Symposium, Cardiff, UK.

**2007** - "Recent advances in micro manufacturing". Special session: Key Technologies for Innovative Manufacturing, IMS Event on Strategies for Global Manufacturing, Zurich, Switzerland, (2007).

## **Reviewer**

### **Funding bodies**

Engineering and Physical Sciences Research Council (UK)

Ranked by EPSRC in the top 6% of College members for participating in peer review activities during the academic year 2017/18.

Slovenian Research Agency (Slovenia).

German Research Foundation / Deutsche Forschungsgemeinschaft (DFG) (Germany)

European Commission

### **SCI Journals**

Over 10 journals. Reviewer profile available at:

<https://publons.com/author/487366/emmanuel-brousseau#profile>