Christopher J. Bailey

Professor
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Research Interests

- Electronics Packaging
- Thermo-mechanical Design
- Product Reliability
- Multi-physics/scale analysis
- AI/Machine Learning
- IP analysis and litigation

Professional Career:

2022- PROFESSOR, SCHOOL OF ELECTRICAL, COMPUTING AND ENERGY ENGINEERING, ARIZONA STATE UNIVERSITY (USA)

- Director of the Centre for Advanced Semiconductor Packaging
- Teach (1) Fundamentals of Microelectronic Packaging (EEE 518) and Co-Design and Modelling for Advanced Semiconductor packaging.

2021-2022 ASSOCIATE DEAN (RESEARCH), FACULTY OF ENGINEERING AND SCIENCE, UNIVERSITY OF GREENWICH

- Chair of Faculty Research & Enterprise Committee providing leadership and oversight of research and enterprise activities.
- Implemented the University Strategy for new Research Centres across the faculty.
- Member of the faculty senior management team (SMT) and faculty board.
- Member of the University Research and Enterprise Committee (UREC).

2018 - 2021 DIRECTOR FOR RESEARCH AND ENTERPRISE, FACULTY OF LIBERAL ARTS AND SCIENCES, UNIVERSITY OF GREENWICH

- Chair of Faculty Research & Enterprise Committee providing leadership and oversight of research and enterprise activities.
- Developed, implemented, and managed the Faculty Research and Enterprise Strategy 2018-2021, supporting 100+ research-active academic staff, 80+ Ph.D. students, and an annual research and enterprise turnover from external sources of £3,000,000+.
- Responsible for the annual internal investments of £1,000,000+ (QR, HEIF, and RCIF), including allocating VC Ph.D. scholarships across the faculty.
- Chaired the faculty Research Excellence Framework (REF) Working Group providing support and guidance for the faculty submissions to 7 REF units of this UK Government assessment of research in UK universities.
- Led the university's cross-faculty REF Engineering (UoA12) submission. This involved identifying 141 outputs for 57 staff submitted, submitting one impact case study, supporting the submission of four additional impact case studies, and writing the UoA12 environment statement.
- Member of the faculty senior management team (SMT) and faculty board.
- Member of the University Research and Enterprise Committee (UREC).

2001 - 2022 **Professor,** School of Computing and Mathematical Sciences, University of Greenwich

- Director of the Computational Mechanics and Reliability Group (CMRG). Successfully supervised 27 Ph.D. students.
- Published 300+ research articles in peer-reviewed publications and secured over £30,000,000 of of research and consultancy income as either PI or Co-I.
- In REF 2014, over 70% of my work was rated either World Leading (4*) or Internationally Excellent (3*) in UoA 12 (Engineering)
- Teaching at the undergraduate level includes Mathematical Modelling, Numerical Methods for Partial Differential Equations, Engineering Mathematics.
- Co-Investigator on the EPSRC (UK equivalent of NSF) Masters Training Program (MTP) in Computational Science and Engineering. Teaching at master level includes: Finite Element Analysis, Modelling in the Electronics and Telecommunications Industry, Electronics Packaging, and Reliability and Risk Analysis.
- Member of the University Academic Council (2016-19). This council is the governing body of the university.

2006 –18 **Faculty Director for Enterprise**, Faculty of Architecture, Computing and Humanities, University of Greenwich.

- Chair of Faculty Enterprise Committee providing governance and oversight of enterprise activities such as consultancy, short courses and CDP, Knowledge Transfer Partnerships, and IP licensing. Responsible for annual internal investments of £200,000+ (HEIF) to support enterprise activities across the faculty.
- Co-Chair of the Faculty Research & Enterprise Committee, providing governance and oversight of research and enterprise activities across the faculty. Member of the faculty senior management team (SMT) and faculty board.

1998 – 01 **Reader**, Dept. Computing & Mathematical Sciences, University of Greenwich, UK

- Delivered course material at the undergraduate level. Courses include Engineering Mathematics, Mathematical Modelling, and Numerical Methods for Partial Differential Equations.
- Published 50+ research articles in peer-reviewed publications and secured £250,000+ of research and consultancy income to support the group's research and enterprise activities.

1993 – 98 **Senior Lecturer**, Dept. Mathematical Sciences, Thames Polytechnic, UK

- Delivered course material at the undergraduate level. Courses include Engineering Mathematics, Mathematical Modelling, and Numerical Methods for Partial Differential Equations.
- Published 30+ research articles in peer-reviewed publications and secured £120,000+ Knowledge Transfer Partnership Grant with Flomerics Limited (Now Mentor Graphics).

1991 – 93 **Senior Research Fellow**, Dept. Mathematical Sciences, Thames Polytechnic, UK

- Funded under the EPSRC ACME Casting Initiative (GR/G36265), I developed the first multi-physics coupled solver for predicting the behavior of metals in the casting process. Key novelty in this research was the use of finite volume discretization methods to solve stress equations.

1988 – 91 **Research Fellow**, Dept. Materials Science, Carnegie Mellon Univ, USA

- Funded by the US Steel Corporation, I implemented a computational fluid dynamics solver to assess Steel's behavior during the continuous casting process. Involved in undertaking research both in the lab and in the steel mills gather data and optimizing the processes.

Education:

1984 **BSc**, Mathematics, Statistics and Computing, Thames Polytechnic (2:1 with Honours)

1988 **Ph.D.**, Computational Modelling, Thames Polytechnic.

- Funded by Warren Springs Labs, the research involved developing mathematical models of the industrial thickening and sedimentation process used to process minerals.

1995 **MBA**, Technology Management, Open University

Honors & Awards:

2024 IEEE EPS Region 10 Award
2022 Recipient of the IEEE Electronics Packaging Society David Feldman Award
2022 Lifetime Achievement Award, IEEE Eurosime
2020 President of the IEEE Electronics Packaging Society
2018 Visiting Professor, Indian Institute of Technology, Kharagpur, India
2016 EPSRC College member
2011 REF Panel Member (Engineering)
2009 Times Higher education award for Outstanding Research Team of the year.
2008 Best Knowledge Transfer Partnership award
2005 Visiting Professor, City University of Hong Kong, China
2003 Royal Society/Kan Tong Po Visiting Professor to Hong Kong, China.
1998 Fellow of the Institute for Mathematics and its Applications

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External Service:

2023- **IEEE Phoenix Chapter Chair,** IEEE Electronic Packaging Society

- Chair the committee and organize events for Phoenix members. Represent the chapter on the IEEE Phoenix Section

2022- **Junior Past-President,** IEEE Electronics Packaging Society

- Chair society nominations committee.

2020 - 21 **President**, IEEE Electronics Packaging Society

- Implemented the society's strategy across its core areas of membership, technology, chapters, conferences, and publications. Lead the society through the challenges posed by COVID. This included moving many of the society's conferences to online platforms. Helped secure US$500,000 to endow the society's highest award: EPS Technical Field Award
- Represented the society at the quarterly IEEE Technical Activities Board (TAB) that represents the overall membership of IEEE with 400,000+ members worldwide.

2019 - 20 **President-Elect**, IEEE Electronics Packaging Society

- Developed the societies strategic plan for 2019 – 2024 (https://eps.ieee.org/about/governance.html)

2017- 22 **External Examiner,** Heriot-Watt University

- External examiner for the EU Erasmus Mundus MSc on Smart Systems Integration. Join MSc between Heriot-Watt (UK), Budapest University of Technology and Economics (Hungary), and the University College of Southeast Norway.

2016 - **Technical Working Group Chair,** IEEE Heterogeneous Integration Roadmap.

- Led the technical working group for modelling and simulation and wrote this roadmap chapter. To date the roadmap has been downloaded 25,000+ times (https://eps.ieee.org/technology/heterogeneous-integration-roadmap.html)

2016 - **Full Member, EPSRC Peer Review College**

- Reviewer for the UK Engineering and Physical Sciences Research Council (UK equivalent to the NSF). Also a member on EPSRC prioritization panels for awarding grants. Most recent being the Mathematical Sciences prioritization panel (March 2021).

2015 - 19 **Vice-President (Conferences)**, IEEE Electronics Packaging Society

- Supported the 30+ international conferences sponsored by the society. Developed the guidance document for conference chairs.

2013 - 19 **Executive Committee Member,** EPSRC Centre for Power Electronics

- Supported the governance of this £17,000,000 multi-institution research initiative in collaboration with the universities of Nottingham, Greenwich, Imperial, Warwick, Manchester, Newcastle, and Bristol.

2012 - 15 **Student Program Director**, IEEE Electronics Packaging Society.

- Supported the society's student branch chapters in Europe, the Americas, and in Asia.

2012 - 22 **IEEE UK & Ireland Chapter Chair,** IEEE EPS and Reliability Societies

- Chair the committee and organize events for UK & Ireland members. Represent the chapter on the board of governors for the IEEE UK & Ireland Section.

2011 - 14 **REF Panel Member, REF 2014.** UK Government Research Excellent Framework**.**

- Full panel member on the UoA12 panel (Engineering), which assessed the quality of research in UK universities through the period 2008-2013.

2006 **Member, UK Government International Delegation to USA**

- Academic Member of the Dti Funded Mission to Investigate latest techniques in Thermal Management of Electronic Systems.

2005 - 15 **Executive Committee Member**, An Innovative Electronics Manufacturing Centre

- Supported the governance of this £15,000,000 10-year EPSRC supported innovative manufacturing centre in collaboration with the universities of Loughborough, Nottingham, Brunel, Bath, Lancaster, and Heriot-Watt.

2004 **Member, UK Government International Delegation to China**

- Global Watch Mission to China. Academic Member of Dti Funded Mission to Investigate R&D in China related to Optoelectronics.

2001 - 07 **Executive Committee Member,** EPPIC Faraday Partnership

- Supported the governance of this Department of Trade and Industry and EPSRC initiative in collaboration with the universities of Heriot-Watt, Durham, Leeds, Sheffield, and Cambridge.

Journal Editorships and Reviewer:

2023- **Associate Editor** ASME Journal of Electronic Packaging

2018- **Associate Editor**: Journal of Mechanics

2016 - **Associate Editor:** IEEE Transactions on Components, Packaging and Manufacturing Technologies

2000 - **Reviewer:** International Journal for Numerical Methods in Engineering; International Journal for Numerical Methods in Fluids; Computers and Structures; Metallurgical Transactions; IEE

Journal of Computing and Control Engineering; IEEE Transactions on Components and Packaging Technologies

Membership of Conference Organizing Committees

2016	**General Chair**, IEEE Therminic Conference, Budapest, Hungary
2015	**Program Chair**, IEEE Therminic Conference, Paris, France
2014	**Local Chair**, IEEE Therminic Conference, Greenwich, UK
2011	**Program Chair,** IEEE Nano, Portland, Oregon, USA
2008	**General Chair**, IEEE Electronics SystemIntegratoin Technology Conference (ESTC), Greenwich, UK
2007	**General Chair**, IEEE EuroSime conference, London, UK
2007	**Program Chair**, IEEE High-Density Packaging Conference, Shanghai, China
2006	**Program Chair,** IEEE Electronics SystemIntegratoin Technology Conference (ESTC), Dresden, Germany.
2004 -	**Technical Committee Member:** ECTC (USA), ESTC (Europe), EPTC (Singapore), ICEPT (China), Therminic (Europe), EuroSime (Europe).

External PhD Examiner:

Examined PhD’s at the following Universities: Brunel, Heriot-Watt, Oxford Brookes, Birmingham, Loughborough, Lancaster, Leeds, Sheffield, Imperial College, Nottingham, Liverpool John Moores, Delft (Netherlands), Chalmers (Sweden), HKUST (Hong Kong), Tampere (Sweden)

Consultancy:

I have consulted with 40+ companies. Example companies include BAe Systems, Agilent Technology, Flomerics Limited, Alcatel, Britannia Refined Metals, Cooksons, Hewlett Packard, Celestica Limited, British Oxygen, TRW, National Physics Laboratory, NIST (USA), Henkel/Loctite, Tin-Technology, Merlin Circuits, Photonics Manufacturing (China), Cutty Sark Trust, Selex, Henkel, TWI, Epigem, Dynex Semiconductors, Semelab, Goodrich Engines, General Electric, Rolls Royce.

Patents/Intellectual Property:

Contributed to Expert Witness work for Irell & Manella (USA) (2014, 2016) and Bird & Bird (2020)

Doctoral Students of Professor Chris Bailey:

	Name	Dissertation Title	Date
1	Yvonne Fryer	A control volume unstructured grid approach to the solution of the elastic stress-strain equations	1993
2	Gary Taylor	A Vertex-based Discretisation Scheme Applied to Material Non-linearity within a Multi-physics Finite Volume Framework	1996

3	Daniel Wheeler	Surface Tension Phenomena in Electronics Manufacturing	2000
4	Avril Stone	A Finite Volume Unstructured Mesh Approach to Dynamic Fluid-Structure Interaction Between Fluids and Linear Elastic Solids	2000
5	Nosrat Fallah	Computational Stress Analysis Using Finite Volume methods	2000
6	Stoyan Stoyanov	Optimisation Modelling for Microelectronics Product Design	2004
7	Suchitra Eddisuriya	Non-Newtonian Flows in Electronics Manufacturing	2005
8	Chunyan Yin	Experimental and Modelling Study of the Flip-Chip Assembly Process	2005
9	Kulvir Dhinsa	Development and application of low Reynolds number turbulence models for air-cooled electronics	2006
10	Jahir Rizvi	Experimental and Modelling Studies of Electronic Packaging Interconnects Formed with lead-Free Materials	2007
11	Steven Ridout	Modelling to Predict Reliability of Solder Joints	2007
12	Yasmine Rosunally	Diagnostic and Prognostic Analysis Tools for Monitoring Degradation in Aged Structures	2012
13	Ying Kit Tang	A Risk Analysis Methodology for Micro/ Nano Manufacturing	2012
14	Thamotharamptillai Satharssan	Prognostics and Health Management for Light Emitting Diodes	2012
15	Elisha Kamara	Testing and Inverse Modelling of Solder Joint Reliability	2013
16	Asif Malik	OPISA: Optoelectronics Packaging Interfaces for Sub-Micron Alignment	2013
17	Nadezhda Strusevich	Numerical Modelling of electrodeposition Process for Printed Circuit Boards Manufacturing	2013
18	Pushpa Rajaguru	Reduced-order Modelling & Numerical Optimisation Approach to Reliability Analysis of Microsystems and Power Modules	2014
19	Xiaoxin Zhu	Computer Simulation of Electromigration in Microelectronics Interconnects	2014
20	Catherine Tonry	Computational Electrohydrodynamics for Fabricating Polymer Microstructures	2015
21	Mani Sekaran Santhanakrishnan	Topology optimisation for fluid flow and heat transfer applications	2018
22	Mohammad Shahjalal	Electro-thermal modelling of power electronics components	2018
23	Kenneth Nwanoro	Finite Element Modelling for Reliability of Power Modules	2019
24	Mominul Ahsan	Computational Data Analysis and Prognostics for Smart Testing of Electronic Products	2019

25	Georgios Tourloukis	Mathematical Modelling and Condition Based Monitoring of 3D Inkjet Printing Process	2019
26	Aditi Rawal	Diagnostic and Prognostic Methodology for Monitoring Silk Fade in a Museum Environment	2021
27	Nneka Daniel	Predicting Degradation of Lithium0ion Battery: A Fusion Approach Based on Physics Informed Machine Learning (PLM) Method	2022

Grants Awarded

Year	Grant Title	Funder	Value
2025-28	Thermomechanical Reliability of Thin-Film RDL	SRC	$315,000
2025-30	SHIELD USA (Co-I)	DoC	$100,000,000
2023-28	Southwest Advanced Prototyping Hub (SWAP-Hub) (Co-I)	NXSTL	$30,000,000
2022-25	MIcroelectronics RELiability driven by Artificial Intelligence (Co-I)	EU	€3,200,000
2023-24	Closed Loop Digitalised Data Analytics and Analysis Platform (DAAP) for Intelligent Design and Manufacturing of Power Electronic Modules (Co-I)	EPSRC	£321,061
2018-21	High Reliability Interconnects: New Methodologies for Lead-Free Solders (PI)	EPSRC	£105,910
2017-21	Multi-Domain Virtual Prototyping Techniques for Wide-Bandgap Power Electronics (Co-I)	EPSRC	£1,079 ,258
2017-18	THEIA: Technically high element alignment (PI)	Innovate - UK	£128,201
2013-20	Underpinning Power Electronics: Hub (Co-I)	EPSRC	£4,108,787
2013-17	Underpinning Power Electronics: Components Theme (Co-I)	EPSRC	£1,976,371
2013-17	NextFactory: All in one manufacturing platform for system in package and micromechatronic systems (Co-I)	EU-FP7	€4,758,207
2011-18	Technology Assessment of Lead-Free Electronics (PI)	DoD (USA)	£750,000
2011-14	PEMREL: Sample power electronic module construction for testing, characterisation, and manufacturability assessment (PI)	EU-CleanSky	€148,196
2010-15	An Innovative Electronics Manufacturing Research Centre (Co-I)	EPSRC	£9,088,809
2008-10	ENDVIEW (PI)	DTI (TSB)	£110,000
2008-12	FAMOBS: Frequency Agile Microwave Bonding System (CoI)	EU-FP7	€2.322,707
2007-10	Equipment for Physics-of-Failure Reliability Research in Electronics (Co-I)	EPSRC	£338,530
2006-08	ENDSENSE (PI)	DTI	£120,000
2005-10	3D-Mintegration: the Design and Manufacture of 3D Integrated Miniaturised Products (Co-I)	EPSRC	£4,116,515

2005-06	An EPIC Visit to China and Japan (PI)	EPSRC	£20,138
2005-08	Modelling the Electrodeposition Process for Microsystems Applications (MEMSA) (PI)	EPSRC	£210,619
2005-07	FLEX-No-Lead (Co-I)	EU-FP6	€1.837,580
2005-08	Modelling Power Modules (PI)	DTI	£220,000
2004-08	Saving the Cutty Sark (PI)	KTP	£180,000
2004-10	An innovative Electronics Manufacturing Centre (Co-I)	EPSRC	£5,698,993
2001-04	A new Manufacturing Process to Remove Silver from Lead (PI)	EPSRC	£176,738
2001-03	Microsystems Assembly Technology for the 21st Century (MAT21) (PI)	EPSRC	£129,379
2001-05	MTP in Computational Science and Engineering for Industry (Co-I)	EPSRC	£446,847
2001-03	Computational Modelling of Engineering Processes on High Performance Clusters (Co-I)	EPSRC	£149,950
2000-02	Lead-Free Soldering for Flip-Chip Assembly Applications (PI)	EPSRC	£110,172
1998-04	Knowledge Transfer Partnerships : Flomerics (PI)	DTI (KTP)	£348,000
1998-00	Modelling Solder Joint Formation in the Flip-Chip Process (PI)	EPSRC	£167,995
1996-98	Modelling the Fillet Lifting Process (PI)	DoC (USA)	£113,000
1994-98	Multi-Physics Advanced Numerical Modelling of the Metals Casting Process (Co-I)	EPSRC	£261,537

Professional Society Membership

Institute of Electrical & Electronic Engineers

International Microelectronics and Packaging

American Society of Mechanical Engineers

Professor Chris Bailey

Publications 1987 – 2024

Publications 2024

1) P. Rajaguru, T. Tilford, C. Bailey and S. Stoyanov, **"Damage Mechanics-Based Failure Prediction of Wirebond in Power Electronic Module,"** in IEEE Access, vol. 12, pp. 25215-25227, (2024), doi: 10.1109/ACCESS.2023.3342689.

Publications 2023

2) S. Stoyanov and C. Bailey, **"Modeling Insights Into the Assembly Challenges of Focal Plane Arrays,"** in IEEE Access, vol. 11, pp. 35207-35219, 2023, doi: 10.1109/ACCESS.2023.3264806.
3) Nwanoro K, Lu H, Yin C, Bailey C**, Advantages of the extended finite element method for the analysis of crack propagation in power modules** (2023), Power Electronic Devices and Components**,** V4, DOI: 10.1016/j.pedc.2022.100027

Publications 2022

4) Xu Y, Xian J, Stoyanov S, Bailey C, Coyle R, Gourlay C, Dunne F**, A multi-scale approach to microstructure-sensitive thermal fatigue in solder joints,** International Journal of Plasticity, V155, (2022), DOI: 10.1016/j.ijplas.2022.103308

5) Stoyanov S, Bailey C, **Deep Learning Modelling for Composite Properties of PCB Conductive Layers**, (*2022)* 23rd International Conference on Thermal, Mechanical and Multi-Physics Simulation and Experiments in Microelectronics and Microsystems (EuroSimE), St Julian, Malta, 2022, pp. 1-7, DOI: 10.1109/EuroSimE54907.2022.9758885.

6) Santhanakrishnan, M.S., Tilford, T. and Bailey, C, **Multi-objective NSGA-II based shape optimisation of the cross-sectional shape of passively cooled heat sinks** (2022), International Journal of Numerical Methods for Heat & Fluid Flow, Vol. 32 No. 3, pp. 1025-1045. DOI: 10.1108/HFF-10-2020-0656

Publications 2021

7) Tilford, T., Stoyanov, S., Bruan, J., Jahnsen JC., Patel, MK., Bailey, C. **Comparative reliability of ink-jet printed electronics packaging** (2021), IEEE Transactions on Components, Packaging, and Manufacturing Technology, 11 (2), pp 351-362 . DOI: 10.1109/TCPMT.2021.3049952.

8) Rajaguru P, Bella M, Bailey C, **Applying Model Order Reduction to the Reliability Prediction of Power Electronic Module Wirebond Structure** (2021) 27th International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)*, Berlin, Germany, 2021, pp. 1-6,* DOI: 10.1109/THERMINIC52472.2021.9626396.

9) Stoyanov S, Stewart P, Bailey C, **Reliability Optimisation and Lifetime Modelling of micro-BGA Assemblies in Harsh Environment Applications** (*2021)* 23rd European Microelectronics and Packaging Conference & Exhibition (EMPC*)*, Gothenburg, Sweden, 2021, pp. 1-8, DOI: 10.23919/EMPC53418.2021.9584970.

10) Daniel N, Stoyanov S, Bailey C, Flynn D, **Review of Fusion Prognostics for Lithium-Ion Batteries - Current State and Future *Challenges*** *(*2021) 44th International Spring Seminar on Electronics Technology (ISSE)*,* Bautzen, Germany, 2021, pp. 1-8, DOI: 10.1109/ISSE51996.2021.9467644.

11) Daniel N, Stoyanov S, Bailey C, Flynn D**, Improved Battery Degradation Modelling with Coupled Physical and Machine Learning Modelling** (*2021) 44th International Spring Seminar on Electronics Technology (ISSE)*, Bautzen, Germany, 2021, pp. 1-6, DOI: 10.1109/ISSE51996.2021.9467565.

12) Bailey C, **Modeling for assessing Semiconductor Packages in High-Reliability Applications**, (2021), 5th IEEE Electron Devices Technology & Manufacturing Conference (EDTM)*, Chengdu, China, 2021, pp. 1-3, DOI: 10.1109/EDTM50988.2021.9434881*

Publications 2020

13) Shahjalal M., Ahmed M.R., Lu H., Bailey C., Forsyth A.J. **An Analysis of the Thermal Interaction between Components in Power Converter Applications** (2020) *IEEE Transactions on Power Electronics,* 30 (9), pp. 9082 – 9094. **DOI**: 10.1109/TPEL.2020.2969350

14) Ahsan M., Stoyanov S., Bailey C., Albarbar A. **Developing Computational Intelligence for Smart Qualification Testing of Electronic Products** (2020) *IEEE Access*, 8, pp. 16922 – 16933. **DOI**: 10.1109/ACCESS.2020.2967858

15) Stoyanov S., Bailey C., Stewart P., Parker M., Roulston J.F. **Experimental and modeling study on delamination risks for refinished electronic packages under hot solder dip loads** (2020) *IEEE Transactions on Components, Packaging and Manufacturing Technology,* 10 (3), pp. 502 – 515. **DOI**: 10.1109/TCPMT.2020.2972635

16) Yin C., Stoyanov S., Bailey C., Stewart P. **Thermomechanical Analysis of Conformally Coated QFNs for High-Reliability Applications** (2020) *IEEE Transactions on Components, Packaging and Manufacturing Technology*, 9 (11), pp. 2210 – 2218. **DOI**: 10.1109/TCPMT.2019.2925874

17) Tonry C.E.H., Patel M.K., Yu W., Desmulliez M.P.Y., Bailey C. **Fabrication of hollow polymer microstructures using dielectric and capillary forces** (2020) *Microsystem Technologies*, 26 (2), pp. 301 – 308. **DOI**: 10.1007/s00542-019-04409-z

18) Rajaguru P., Lu H., Bailey C., Bella M. **Modelling and analysis of vibration on power electronic module structure and application of model order reduction** (2020) *Microelectronics Reliability*, 110, **DOI**: 10.1016/j.microrel.2020.113697

19) Hinojosa Herrera A.E., Walshaw C., Bailey C. **Improving Black Box Classification Model Veracity for Electronics Anomaly Detection** (2020) *Proceedings of the 15th IEEE Conference on Industrial Electronics and Applications, ICIEA 2020,* pp. 1092 – 1097, **DOI:** 10.1109/ICIEA48937.2020.9248258

20) Stoyanov S., Bailey C., Stewart P., Morrison G. **Reliability impact of assembly materials for Micro-BGA components in high reliability applications** (2020) *Proceedings - 2020 IEEE 8th Electronics System-Integration Technology Conference, ESTC 2020,* **DOI***:* 10.1109/ESTC48849.2020.9229828

21) Stoyanov S, Bailey C, Waite R, Hicks C, Golding T, **Modelling Indium Interconnects for Ultra Fine-Pitch Focal Plane Arrays,**(*2020) 19th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm)*, Orlando, FL, USA, 2020, pp. 1139-1146, DOI: 10.1109/ITherm45881.2020.9190397.

22) Herrera, A, Walshaw C, Bailey C, **Failure Mode & Effect Analysis and another Methodology for Improving Data Veracity and Validity** Annals of Emerging Technologies in Computing (AETiC), pp. 9-16, Vol. 4, No. 3, (2020, DOI: 10.33166/AETiC.2020.03.002.

23) Bailey C, **Advances in Power Electronics** *(*2020) Pan Pacific Microelectronics Symposium (Pan Pacific)*,* HI, USA, 2020, pp. 1-4, DOI:10.23919/PanPacific48324.2020.9059348*.*

Publications 2019

24) Stoyanov, S., Ahsan, M., Bailey, C., Wotherspoon, T., Hunt, C. **Predictive analytics methodology for smart qualification testing of electronic components** (2019) *Journal of Intelligent Manufacturing*, 30 (3), pp. 1497-1514. **DOI**: 10.1007/s10845-018-01462-9

25) Rajaguru, P., Lu, H., Bailey, C. **Time integration damage model for Sn3.5Ag solder interconnect in power electronic module** (2019) *IEEE Transactions on Device and Materials Reliability*, 19 (1), art. no. 8606225, pp. 140-148. **DOI:** 10.1109/TDMR.2019.2891949

26) Tonry, C.E.H., Patel, M.K., Yu, W., Desmulliez, M.P.Y., Bailey, C. **Fabrication of hollow polymer microstructures using dielectric and capillary forces** (2019) *Microsystem Technologies*, **DOI**: 10.1007/s00542-019-04409-z

27) Dinmohammadi, F., Flynn, D., Bailey, C., Pecht, M., Yin, C., Rajaguru, P., Robu, V. **Predicting damage and life expectancy of subsea power cables in offshore renewable energy applications** (2019) *IEEE Access*, 7, art. no. 8704223, pp. 54658 -54669. **DOI:** 10.1109/ACCESS.2019.2911260

28) Adamietz, R., Desmulliez, M.P.Y., Pavuluri, S.K., Tilford, T., Bailey, C., Schreier-Alt, T., Warmuth, J. **Reliability Testing and Stress Measurement of QFN Packages Encapsulated by an Open-Ended Microwave Curing System** (2019) *IEEE Transactions on Components, Packaging and Manufacturing Technology*, 9 (1), art. no. 8418396, pp. 173-180. **DOI:** 10.1109/TCPMT.2018.2859031

29) Malik, A., Bailey, C., Stoyanov, S. **Identifying the Optimal Step Size for Gradient Descent Using Monte Carlo Simulation in Optimisation of Micro-laser Welding of Optoelectronics** (2019) *ITT 2018 - Information Technology Trends: Emerging Technologies for Artificial Intelligence*, art. no. 8649548, pp. 281-285. **DOI:** 10.1109/CTIT.2018.8649548

30) Rajaguru P, Santhanakrishnan M, Tilford T, Bailey C, **Design of Additively Manufactured Heatsinks for Power Electronics Thermal Management using Adjoint Level-set Topology Optimization** (*2019) 25th International Workshop on Thermal Investigations of ICs and Systems (THERMINIC)*, Lecco, Italy, 2019, pp. 1-7, DOI: 10.1109/THERMINIC.2019.8923530.

31) Santhanakrishnan M, Tilford T, Bailey C, **Multi-Material Heatsink Design Using Level-Set Topology Optimization**, (2019) *IEEE Transactions on Components, Packaging and Manufacturing Technology*, vol. 9, no. 8, pp. 1504-1513, Aug. 2019, DOI: 10.1109/TCPMT.2019.2929017.

32) Stoyanov S, Bailey C, Waite R, Hicks C, Golding T,(2019) **Packaging Challenges and Reliability Performance of Compound Semiconductor Focal Plane Arrays**, *22nd European Microelectronics and Packaging Conference & Exhibition (EMPC)*, Pisa, Italy, 2019, pp. 1-8, DOI: 10.23919/EMPC44848.2019.8951842.

Publications 2018

33) Nwanoro, K.C., Lu, H., Yin, C., Bailey, C. **Numerical Simulation of the Junction Temperature, the Coolant Flow Rate and the reliability of an IGBT Module** (2018) *THERMINIC 2018 - 24th International Workshop on Thermal Investigations of ICs and Systems,* **DOI:** 10.1109/THERMINIC.2018.8593290

34) Nwanoro, K.C., Lu, H., Yin, C., Bailey, C. **An Approximate Numerical Method for the Prediction of Plastic Strain in Layered Structures** (2018) *2018 7th Electronic System-Integration Technology Conference, ESTC 2018,* **DOI:** 10.1109/ESTC.2018.8546343

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