

# Dr Basel Wael Abu-Jamous

Senior Data Scientist / Computational Biologist

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Member of the ISCB (2017 – Present)

Member of the Jordan Engineers Association (2010 – Present)

Passionate about developing and applying the next generation of data science, artificial intelligence, machine learning, and bioinformatics to facilitate leveraging anonymised real-world observational patient data, clinical trial data, and/or multiomic data in order to answer timely questions and address problems facing both the healthcare system and the pharmaceutical industry. I have a special interest in omic data analysis (e.g. NGS genomics and transcriptomics), where I enjoy the underpinning biology as much as planning, designing, implementing & interpreting data science experiments.

## Employment

**01/2019 – Present**      **Sensyne Health plc, Oxford, UK**  
Discovery Sciences Division

- 12/2019 – Present  
*Senior Data Scientist*
  - I continue to contribute to the Discovery Sciences Division with similar tasks to those since January 2019 (below) as the team scales up and builds structure.
- 01/2019 – 11/2019  
*Bioinformatician – Scientist and Researcher*
  - I contribute to projects analysing anonymised electronic health record data from the NHS with tasks including discussing client requirements, project planning, progress monitoring and supervision, hands-on implementation ranging from data cleaning to advanced algorithmic developments and analysis, and reporting.
  - I play a key role in projects involving genomic and multiomic data as an area in which I have a special interest and a lot of experience.

**01/2019 – 06/2019**      **Bioinformatics Consultant - Independent**

- I continue to provide bioinformatics, on independent consultancy basis, to the inter-institutional C<sub>4</sub> Rice Project, led by the University of Oxford.

**07/2016 – 01/2019**      **University of Oxford, Oxford, UK**  
Department of Plant Sciences  
*Post-Doctorate Research Assistant – Bioinformatics*

- Discovered the previously unknown C<sub>4</sub> chloroplastic pyruvate exporter protein, which completed an entire C<sub>4</sub> photosynthesis cycle for the first time in history.
- Bioinformatically supported the C<sub>4</sub> Rice Project (<https://c4rice.com>) by analysis of NGS, genomic, transcriptomic, proteomic, metabolomics, and phylogenomic datasets.
- Designed, implemented, published, and released the *Clust* algorithm, which has the power to extract optimal co-expressed gene clusters from gene expression data automatically.  
<https://github.com/BaselAbujamous/clust>; <http://clust.baselabujamous.com>

**01/2015 – 06/2016**      **Brunel University London, Uxbridge, UK**  
Department of Electronic and Computer Engineering  
*Post-Doctorate Research Assistant – Bioinformatics*

- Bioinformatically identified a prognostic hypoxia transcriptomic signature in breast cancer.
- Developed a bioinformatic algorithm, *UNCLES*, with the ability to apply unsupervised clustering to multiple transcriptomic datasets collectively.

## Education

- 2013 – 2015      **PhD** Electrical Engineering and Electronics / Bioinformatics  
**Brunel University London**, Uxbridge, Greater London, UK  
 Project: “Erythropoiesis in Health and Disease” – UK NIHR funded (NIHR-RP-PG-0310-1004-AN)  
 Viva (examination) date: 3<sup>rd</sup> June 2015      Awarding date: 7<sup>th</sup> July 2015  
 Recipient of the *Dean’s Prize for Innovation and Impact in Doctoral Research* (December 2015)
- 2011 – 2013      **Research student** in Electrical Engineering and Electronics / Bioinformatics  
**University of Liverpool**, Liverpool, UK  
 Project: “Erythropoiesis in Health and Disease” – UK NIHR funded (NIHR-RP-PG-0310-1004-AN)  
*Completed after transferring with my supervisor to Brunel University London in April 2013*
- 2010 – 2011      **MSc (Eng)** Information and Intelligence Engineering  
**University of Liverpool**, Liverpool, UK  
 Thesis title: the analysis of microarray data  
 Average: 90% (Distinction)      Class rank: 1<sup>st</sup>  
 Recipient of the *Sir Robin Saxby Prize* (October 2011)
- 2006 – 2010      **BSc (Eng)** Computer Engineering  
**University of Jordan**, Amman, Jordan  
 Graduation project title: autonomous chess playing robot  
 GPA: 3.75/4.0 (Excellent)      Class rank: 2<sup>nd</sup>

## Other Training and Minor Employment Posts

- 2013 – 2014      Lab Demonstrator, **Brunel University London**, Uxbridge, UK  
 2012 – 2013      Lab Demonstrator, **University of Liverpool**, Liverpool, UK  
 06/2010 – 08/2010      Software Engineer (Trainee), **Leading Point**, Amman, Jordan (<http://www.leading-point.com>)

## Languages

- 1) Arabic: Native      2) English: Fluent

## Technical Skills

- 1) **Research skills/qualities:** bioinformatics, machine learning, statistics, software engineering, highly organised, project planning, requirement management, problem solving, analysis and reasoning, self-learning, self-motivation, and written and oral communication.
- 2) **Computer programming:** Python (excellent), MATLAB (excellent), Git (very good), R (very good), C#.NET (very good), Linux (very good), Perl (good), Microsoft Azure Cloud, ASP.NET, C++, VB.NET, and Java.
- 3) **Data:** Patient electronic health records (NHS data), NGS data, gene expression microarrays, genomics, proteomics, metabolomics, sequence alignment, phylogenetics

## Major Awards and Achievements

- 1) **Dean’s Prize for Innovation and Impact in Doctoral Research** within the Department of Electronic and Computer Engineering, Brunel University London. This prestigious prize is given to single PhD graduate within each department in every round of graduation. (December 2015).
- 2) **Full PhD scholarship** at Brunel University London under the project (Ref. NIHR-RP-PG-0310-1004-AN) supported by the UK National Institute for Health Research (NIHR). (April 2013 to December 2014).
- 3) **The Sir Robin Saxby Prize** for being the top student in the M.Sc. degree class of 2011 at the Department of Electrical Engineering and Electronics, the University of Liverpool. (October 2011).
- 4) **First place** in the ACM programming contest, The University of Jordan. (June 2009).
- 5) **First place** in “Dev Challenge” projects contest, for the “New Master Slave Model for Distributed Genetic Algorithms” project, University of Jordan. (May 2009).

**All publications are listed in the Appendix below**

## Appendix: Full list of publications

### Books and book chapters

- 1) Basel Abu-Jamous, Chao Liu, David J. Roberts, Elvira Brattico, Asoke K. Nandi. "Data-driven analysis of collections of big datasets by the Bi-CoPaM method yields field-specific novel insights" in *Frontiers in Electronic Technologies*, Springer, 2017, ISBN: 9789811042348.
- 2) Basel Abu-Jamous, Rui Fa, and Asoke K. Nandi. "Integrative cluster analysis in bioinformatics". *John Wiley & Sons*, 2015, ISBN: 978-1118906538.

### Journal publications (N = 13, \*first or joint first author = 8)

- 1) Daniela Vlad, Basel Abu-Jamous, Peng Wang, Jane Langdale, "A modular steroid-inducible gene expression system for use in rice". *BMC Plant Biology*, 2019, **19**: 426. [Link](#).
- \* 2) Basel Abu-Jamous and Steven Kelly, "Clust: automatic extraction of optimal co-expressed gene clusters from gene expression data". *Genome Biology*, 2018, **19**: 172. [Link](#).
- \* 3) Basel Abu-Jamous, Francesca M. Buffa, Adrian L. Harris, Asoke K. Nandi. "In vitro downregulated hypoxia transcriptome is associated with poor prognosis in breast cancer". *Molecular Cancer*, 2017, **16**: 105. [Link](#).
- 4) Chao Liu, Elvira Brattico, Basel Abu-Jamous, Carlo S. Pereira, Thomas Jacobsen, Asoke K. Nandi. "Effect of explicit evaluation on neural connectivity related to listening to unfamiliar music". *Frontiers in Human Neuroscience*, 2017, **11**: 611. [Link](#).
- 5) Peng Wang, Shanta Karki, Akshaya Biswal, Hsiang-Chun Lin, Mary Jacqueline Dionora, Govinda Rizal, Xiaojia yin, Mara Schuler, Tom Hughes, Jim Fouracre, Basel Abu-Jamous, Olga Sedelnikova, Shuen-Fang Lo, Anindya Bandyopadhyay, Su-May Yu, Steve Kelly, Paul Quick, Jane Langdale. "Candidate regulators of early leaf development in maize perturb hormone signalling and secondary cell wall formation when constitutively expressed in rice". *Scientific Reports*, 2017, **7**: 4535. [Link](#).
- \* 6) Alison T. Merryweather-Clarke\*, Alex J. Tipping\*, Abigail A. Lamikanra\*, Rui Fa\*, Basel Abu-Jamous\*, Hoi Pat Tsang, Lee Carpenter, Kathryn J. H. Robson, Asoke K. Nandi, David J. Roberts. "Distinct gene expression program dynamics during erythropoiesis from human induced pluripotent stem cells compared with adult and cord blood progenitors". *BMC Genomics*, 2016, **17**: 817. [Link](#). (\*Contributed equally).
- 7) Chao Liu, Basel Abu-Jamous, Elvira Brattico, Asoke K. Nandi. "Towards tunable consensus clustering for studying functional brain connectivity during affective processing". *International Journal of Neural Systems (IJNS)*, 2016, **27**(2): 1650042. [Link](#).
- \* 8) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "UNCLES: Method for the identification of genes differentially consistently co-expressed in a specific subset of datasets". *BMC Bioinformatics*, 2015, **16**: 184. [Link](#).
- \* 9) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Application of the Bi-CoPaM method to five *Escherichia coli* datasets generated under various biological conditions". *Journal of Signal Processing Systems*, 2015, **79**(2): 159-166. [Link](#).
- \* 10) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Comprehensive analysis of forty yeast microarray datasets reveals a novel subset of genes (APha-RiB) consistently negatively associated with ribosome biogenesis". *BMC Bioinformatics*, 2014, **15**: 322. [Link](#).
- \* 11) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Paradigm of Tunable Clustering using Binarization of Consensus Partition Matrices (Bi-CoPaM) for Gene Discovery". *PLOS ONE*, 2013, **8**(2): e56432. [Link](#).
- \* 12) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Yeast gene CMR1/YDL156W is consistently co-expressed with genes participating in DNA-metabolic processes in a variety of stringent clustering experiments". *Journal of the Royal Society Interface*, 2013, **10**(81): 20120990. [Link](#).
- 13) Fengyu Cong, Vinoo Alluri, Asoke K. Nandi, Petri Toiviainen, Rui Fa, Basel Abu-Jamous, Li-yun Gong, Bart G. W. Craenen, et al., "Linking brain responses to naturalistic music through analysis of ongoing EEG and stimulus features", *IEEE Transactions on Multimedia*, 2013, **15**(5): 1060-1069. [Link](#).

### Full-length international conference publications (N = 16, \*first or joint first author = 8)

- \* 1) Basel Abu-Jamous, Steven Kelly. "Simultaneous Clustering of Multiple Heterogeneous Gene Expression Datasets". *Proceedings of the IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT)*, Amman, Jordan, 2017.
- 2) Chao Liu, Elvira Brattico, Basel Abu-Jamous, Asoke Nandi. "Exploration of distance metrics in consensus clustering analysis of fMRI data". *Proceedings of the 22nd International Conference on Digital Signal Processing (DSP)*, London, UK, 2017.
- 3) Chao Liu, Rui Fa, Basel Abu-Jamous, Elvira Brattico, Asoke K. Nandi. "Scalable clustering based on enhanced-smart for large-scale fMRI datasets". *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2015, Brisbane, Australia, 2015, pp. 962-966.
- 4) Rui Fa, Basel Abu-Jamous, David J. Roberts, Asoke K. Nandi. "CoCE-SMART: consensus clustering based on enhanced splitting-merging awareness tactics". *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2015, Brisbane, Australia, 2015, pp. 2011-2015.

- 5) Chao Liu, Basel Abu-Jamous, Elvira Brattico, Asoke Nandi. "Clustering consistency in neuroimaging data analysis". *Proceedings of the International Conference on Fuzzy Systems and Knowledge Discovery (FSKD)*, 2015, Zhangjiajie, China, pp.1118-1122.
- \* 6) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "M-N scatter plots technique for evaluating varying-size clusters and setting the parameters of Bi-CoPaM and UNCLES methods". *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2014, Florence, Italy, pp. 6726-6730.
- 7) Rui Fa, Basel Abu-Jamous, David J. Roberts, Asoke K. Nandi. "Splitting-while-merging framework for clustering high-dimension data with component-wise expectation conditional maximisation". *Proceedings of the International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2014, Florence, Italy, pp. 2932-2936.
- \* 8) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Bi-CoPaM ensemble clustering application to five *Escherichia coli* bacterial datasets". *Proceedings of the European Signal Processing Conference (EUSIPCO)*, 2014, Lisbon, Portugal.
- \* 9) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Identification of genes consistently co-expressed in multiple microarray datasets by a genome-wide Bi-CoPaM approach". *Proceedings of International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2013, Vancouver, Canada, pp. 1172-1176.
- \* 10) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Method for the identification of the subsets of genes specifically consistently co-expressed in a set of datasets". *Proceedings of the IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, 2013, Southampton, UK, doi: 10.1109/MLSP.2013.6661907.
- 11) Rui Fa, Basel Abu-Jamous, David J. Roberts, Asoke K. Nandi. "Enhanced SMART framework for gene clustering using successive processing". *Proceedings of the IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, 2013, Southampton, UK, doi: 10.1109/MLSP.2013.6661964.
- 12) Rui Fa, Basel Abu-Jamous, Asoke K. Nandi. "Bi-CoPaM ensemble clustering application to five *Escherichia coli* bacterial datasets". *Proceedings of the European Signal Processing Conference (EUSIPCO)*, 2013, Marrakech, Morocco.
- \* 13) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Hybrid binarisation technique for the Bi-CoPaM method". *Proceedings of the Constantinides International Workshop on Signal Processing (CIWSP)*, 2013, London, UK, doi: 10.1049/ic.2013.0006.
- \* 14) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Comprehensive analysis of multiple microarray datasets by binarization of consensus partition matrix". *Proceedings of the IEEE International Workshop on Machine Learning for Signal Processing (MLSP)*, 2012, Santander, Spain, paper no. 62, doi: 10.1109/MLSP.2012.6349787.
- \* 15) Basel Abu-Jamous, Rui Fa, David J. Roberts, Asoke K. Nandi. "Binarization of consensus partition matrix for ensemble clustering". *Proceedings of the European Signal Processing Conference (EUSIPCO)*, 2012, Bucharest, Romania, pp. 2193-2197.
- 16) Rui Fa, Basel Abu-Jamous, Asoke K. Nandi. "Development and evaluation of kernel-based clustering validity indices". *Proceedings of the European Signal Processing Conference (EUSIPCO)*, 2012, Bucharest, Romania, pp. 634-638.

#### Conference posters / talks (without full-length papers)

- 1) Basel Abu-Jamous and Steve Kelly, "Clust: automatic identification and optimisation of consensus clusters of co-expressed genes from multiple heterogeneous transcriptomic datasets". *Great Lakes Bioinformatics (GLBIO) conference*, 2017, Chicago, IL, USA. [Talk].
- 2) Basel Abu-Jamous and Steve Kelly, "Bi-CoPaM: an automated method to identify clusters of consistently co-expressed genes from multiple heterogeneous transcriptomic datasets". *Next Generation Sequencing (NGS) conference*, 2017, Barcelona, Spain. [Talk].
- 3) Basel Abu-Jamous and Steve Kelly, "Differential maturation of bundle sheath and mesophyll cells during photosynthetic activation in C<sub>4</sub> species". *Enhancing photosynthesis in crop plants: targets for improvement*, 2016, The Royal Society, London, UK. [Poster].
- 4) Chao Liu, Basel Abu-Jamous, Elvira Brattico, Asoke K. Nandi. "Consensus clustering reveals neural networks during affective music processing". *The Neurosciences and Music V*, 2014, Dijon, France. [Poster].
- 5) Basel Abu-Jamous, Maysam Abbod, Asoke K. Nandi. "Comprehensive analysis of high throughput biological datasets". *Brunel Annual Student Research Conference (ResCon)*, 2014, London, UK. [Talk].
- 6) Basel Abu-Jamous, Maysam Abbod, Asoke K. Nandi. "Comprehensive analysis of high throughput biological datasets". *Brunel Annual Student Research Conference (ResCon)*, 2013, London, UK. [Poster].