

# Nabil-Fareed Alikhan

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## Education and Employment

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- **Research Fellow in Genomics of Bacterial Pathogens** **2014 – Current**  
Microbiology and Infection, Warwick Medical School, University of Warwick, United Kingdom  
Post-doc with Prof. Mark Achtman FRS. Duties included co-development of EnteroBase ([enterobase.warwick.ac.uk](http://enterobase.warwick.ac.uk)), a web-resource for ‘big data’ genomic analysis of Enteropathogens and adapting existing robotic genotyping to perform library preparations for high-throughput sequencing.
- **Doctor of Philosophy (Microbiology)** **2010 – 2015**  
Primary Supervisor: Scott Beatson  
Associate Advisors: Nouri Ben Zakour & Nicola Petty  
University of Queensland, Australia  
Thesis title: *Escherichia coli* virulence: a genomic approach
- **Research Associate** **March 2009 – November 2009**  
School of Chemistry and Molecular Biosciences, University of Queensland, Australia  
Duties included system administration and technical support for Linux servers and MacOSX workstations within the Beatson Microbial Genomics group.
- **Bachelor of Science (Honours – First Class) (Microbiology)** **2009**  
University of Queensland, Australia  
Thesis title: Comparative genome analysis of *Escherichia coli* VR 50
- **Research Associate** **November 2008 – January 2009**  
School of Chemistry and Molecular Biosciences, University of Queensland, Australia  
Duties included programming software pipelines for bioinformatics especially for parallelization on high performance computer clusters; and server administration for sharing bacterial genomics data.
- **Bachelor of Science (Biochemistry) & Bachelor of Information Technology** **2004 - 2008**  
University of Queensland, Australia

## Skills

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| <b>Bioinformatics</b>        | <ul style="list-style-type: none"><li>• <i>De novo</i> assembly and mapping of sequencing reads</li><li>• Comparative genome analysis</li><li>• Phylogenetic inference e.g. PhyML &amp; RAxML</li><li>• Statistics: Python’s matplotlib/numpy/scipy libraries and R.</li><li>• Linux &amp; command-line environment</li></ul>   |
| <b>Software Development</b>  | <ul style="list-style-type: none"><li>• Development of EnteroBase, a web-resource serving over 80,000 genome assemblies, providing genotyping, genome analysis and curated metadata for over 300 users in a range of major institutions.</li><li>• Development of BRIG software for visualisation of whole genome comparisons. 15,399 total downloads in over 57 different countries.</li><li>• Developing novel visualisation tools and large-scale analysis</li><li>• Pipelines for high performance parallel computing architectures</li></ul> |
| <b>Programming Languages</b> | <ul style="list-style-type: none"><li>• Full Stack Developer: Python, Java, Bash &amp; Perl, Relationship databases (SQL), Web-frameworks (Python-Flask), JavaScript, HTML &amp; PHP</li></ul>  |

## Publications

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1. **Nabil-Fareed Alikhan**, Nicola K Petty, Nouri L Ben Zakour, Scott A Beatson.  
BLAST Ring Image Generator (BRIG): simple prokaryote genome comparisons  
**BMC Genomics 12 (1), 402 (2011).**  
**378 Citations (Google Scholar).** **22,415 downloads of BRIG software**  
**Listed in Top 100 most accessed papers for BMC Genomics.**
2. Scott A Beatson, Maria das Graças de Luna, Nathan L Bachmann, **Nabil-Fareed Alikhan**, Kirstin R Hanks, Mitchell J Sullivan, Bryan A Wee, Angela C Freitas-Almeida, Paula A Dos Santos, Janyne TB de Melo, Derrick JP Squire, Adam F Cunningham, J Ross Fitzgerald, Ian R Henderson.  
Genome sequence of the emerging pathogen *Aeromonas caviae*  
**Journal of Bacteriology 193 (5), 1286-1287 (2011). 29 Citations (Google Scholar).**
3. Scott A. Beatson, Nouri L. Ben Zakour, Makrina Totsika, Amanda N. Mabbett, Rebecca E. Watts, Jan M. Szubert, Brian Forde, Sohinee Sarkar Minh-Duy Phan, Kate M. Peters, Nicola K. Petty, **Nabil-Fareed Alikhan**, Teik Min Chong, Wai-Fong Yin, Kok-Gan Chan, Viktoria Hancock, David W. Ussery, Glen C. Ulett, Mark A. Schembri  
Molecular analysis of the asymptomatic bacteriuria *Escherichia coli* strain VR50 reveals adaptation to the urinary tract by gene acquisition.  
**Infection and Immunity 83 (5), 1749-1764 (2015). 4 Citation (Google Scholar).**
4. Alexander Wailan, Hanna Sidjabat, Wan Keat Yam, **Nabil-Fareed Alikhan**, Nicola Petty, Anna Sartor, Deborah Williamson, Brian Forde, Mark Schembri, Scott Beatson, David Paterson, Timothy Walsh, and Sally Partridge  
Mechanisms involved in acquisition of bla<sub>NDM</sub> genes by IncA/C2 and IncFIIY plasmids  
**Antimicrobial Agents and Chemotherapy 60 (7) 4082-4088 (2016) 2 Citation (Google Scholar).**

## Oral Presentations

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*Conference presentations are bolded.*

1. **Scalable and user-friendly workflows for Molecular Epidemiology using EnteroBase**  
11th International Meeting on Microbial Epidemiological Markers. Estoril, Portugal. 9-12.3.2016
2. **EnteroBase: A Powerful, User-Friendly Online Resource for Analysing Genomic Variation**  
1<sup>st</sup> ASM Conference on Rapid NGS Bioinformatic Pipelines for Enhanced Molecular Epidemiologic Investigation of Pathogens. Washington, DC USA. 24-27.09.2015
3. Genomic analysis of *E. coli* O157:H7 associated with increased excretion, or 'super-shedding', in cattle  
Genetics and Genomics Seminar series. University of Queensland, Brisbane, Australia. 26.09.2014
4. Comparative genomics of non-O157 Shiga toxigenic *E. coli*  
Division of Microbiology and Infection Seminar Series, Warwick Medical School, The University of Warwick, Coventry, United Kingdom. 16.10.2013
5. Comparative genomics of non-O157 Shiga toxigenic *E. coli*  
Genetics and Genomics Seminar series. University of Queensland, Brisbane, Australia. 26.07.2013
6. Comparative genomics of non-O157 Shiga-toxigenic *Escherichia coli* reveals distinct lineages with multiple approaches to achieve pathogenesis  
8th Annual SCMB Research Students Symposium. University of Queensland, Brisbane, Australia. 22.11.2012
7. **Visualising bacterial genome comparisons of next-generation sequencing datasets using BRIG**  
Microbial Informatics Workshop at The Australian Society for Microbiology 2012 Annual Scientific Meeting. Brisbane, Australia. 1.7.2012.
8. The BLAST Ring Image Generator: simple prokaryote genome comparisons  
ASM QLD Becton Dickinson Student Award. University of Queensland, Brisbane, Australia. 26.3.2012

## Conference and Symposium posters

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*Presenting author is italicised*

1. Comparative genomics of non-O157 Enterohaemorrhagic *Escherichia coli*.  
*NF Alikhan*, NK Petty, NL Ben Zakour, SA Beatson  
10th International Meeting on Microbial Epidemiological Markers. Paris, France. 2-5.10.2013.
2. Analysis and visualisation of genome comparisons within a large scale genomic study of Shiga-Toxin Producing *E. coli*.  
*NF Alikhan*, NK Petty, NL Ben Zakour, SA Beatson  
The Australian Society for Microbiology 2012 Annual Scientific Meeting. Brisbane, Australia. 1-4.7.2012.
3. Bacterial genome analysis made easy  
*NF Alikhan*, MJ Sullivan, NK Petty, NL Ben Zakour, SA Beatson  
32<sup>nd</sup> Annual Lorne Genome Conference 2011. Mantra Erskine Resort, Lorne, Victoria. 13-15.2.2011.
4. BLAST Ring Image Generator (BRIG): Simple prokaryote genome comparisons.  
*NF Alikhan*, NK Petty, NL Ben Zakour, SA Beatson.  
6th Annual SCMB Research Students Symposium. University of Queensland, St Lucia, QLD. 25.11.2010.
5. Interactive Genome Orthology Resource (IGOR): A novel approach to comparing genomes  
*NF Alikhan* & SA Beatson.  
5th Annual SCMB Research Students Symposium. University of Queensland, St Lucia, QLD. 24.11.2009.

## Service

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### Chair - Research Students Consultative Committee

2012

School of Chemistry and Molecular Biosciences.

Duties included acting as a representative for research students, liaising between the school faculty and students, and organising the annual school symposium. Organising the school symposium involved negotiating industry sponsors; organising catering, awards and judges for those awards; publishing an abstract booklet and chairing speaking sessions. The symposium was a whole day event, which that year had 60 presenters & over 200 attendees.

## Teaching

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- 2013 BIOL3004 – Genomics & Bioinformatics, University of Queensland  
This included developing and writing tutorials for using BRIG to visualise genome comparisons and instructing students about other bioinformatics tools for analysing sequencing data.

## Scholarships and Awards

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- Australian Postgraduate Award 2010-2013
- Australian Society for Microbiology (Queensland branch) Becton Dickinson Student Awards 2012 Runner up
- American Society for Microbiology Student-Postdoc Travel Grant Award 2015

## Professional Memberships

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Australian Society for Microbiology 2009 – 2015

American Society for Microbiology 2015 – Current

## **Referees**

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**Professor Mark Achtman FRS** (m.achtman@warwick.ac.uk)

Professor in Bacterial Population Genetics

Microbiology and Infection, Warwick Medical School, University of Warwick, United Kingdom

**Professor Mark Pallen** (m.pallen@warwick.ac.uk)

Professor in Microbial Genomics

Microbiology and Infection, Warwick Medical School, University of Warwick, United Kingdom

**Associate Professor Scott Beatson** (s.beatson@uq.edu.au)

ARC Postdoctoral Research Fellow

Australian Infectious Diseases Research Centre, University of Queensland, Australia

**Professor Mark Schembri** (m.schembri@uq.edu.au)

ARC Future Fellow & Deputy Director of Australian Infectious Diseases Research Centre (AIDRC)

Australian Infectious Diseases Research Centre, University of Queensland, Australia