

ROHIT FARMER

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RESEARCH SUMMARY

Over eight years' experience in interdisciplinary research, applying computational methods at the intersection of biology, chemistry and medicine. Currently I am working on the application of "deep learning" in clinical and molecular studies. I have extensive experience in protein structure/complex prediction, modelling protein-protein interactions, molecular dynamics simulations and virtual screening.

APPOINTMENTS

Teaching & Research

Feb 2018 – till date **Postdoctoral Research Associate**, Department of Pathology and Immunology, School of Medicine, Washington University in St. Louis, St. Louis, USA

Mentor: Dr. S. Joshua Swamidass

- *Applying deep learning to solve various problems in medicine, proteins and chemistry.*

Apr 2015 – Jan 2018 **Assistant Professor**, Department of Computational Biology and Bioinformatics, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, India

& Jul 2008 - Sep 2011

- *Taught undergraduate and postgraduate courses: Fundamentals of Bioinformatics, Structural Bioinformatics, Molecular Modelling, & Computer Aided Drug Design.*

- *Supervised 5 undergraduate and 2 masters thesis.*

Sep 2016 – Jan 2018 **Associate Editor**, The Allahabad Journal of Agriculture, Science & Technology (Formerly The Allahabad Farmer).

Administrative

Nov 2015 – Nov 2016 **International Training Associate** at the Directorate of International Education and Training, SHUATS, India

EDUCATION

Dec 2015 **PhD Biosciences**, University of Birmingham, United Kingdom

Thesis title: Modelling polyketide synthases and related macromolecular complexes

Thesis download: <http://etheses.bham.ac.uk/5909/>

Supervisors: Dr. Peter J. Winn and Prof. Christopher M. Thomas

Jul 2008 – Jun 2010 **Master of Technology in Bioinformatics**, Sam Higginbottom Institute of Agriculture, Technology and Sciences, India

CGPA 9.35/10 **Project title:** Epigenetic changes induced by Listeriolysin O modulated histone modifications in *Listeria monocytogene*

Silver Medal **Supervisor:** Dr. Budhayash Gautam

Class Rank First

Jul 2004 – Jun 2008 **Bachelor of Technology in Biotechnology (Genetic Engineering)**, Allahabad Agricultural Institute Deemed University, India

CGPA 8.41/10 **Project title:** Comparative Modelling of Steroidogenic Acute Regulatory Lipid Transfer Domains in *Arabidopsis thaliana*.

First Division with Honours **Supervisor:** Dr. Gitanjali Yadav

CERTIFICATION

- **Algorithms for DNA Sequencing** by Johns Hopkins University on Coursera. Certificate earned on May 19, 2017
- **Python for Genomic Data Science** by Johns Hopkins University on Coursera. Certificate earned on January 20, 2017

FELLOWSHIPS & AWARDS

- Young Scientist Award from the Society of Bioinformatics and Biological Science, India, 2015
- Travel grant from the Biochemical Society to attend the 28th Annual Symposium of The Protein Society, USA, 2014
- Travel grant from the EMBL to attend 15th EMBL PhD Symposium, Germany, 2013
- Travel grant from the National Science Foundation to attend ISMB/ECCB'13, Germany, 2013
- George Parks travel grant from the University of Birmingham to attend Molecular Perspectives On Protein-Protein Interactions, Poland, 2013
- Travel grant from the Swiss Foundation for Excellence and Talent in Biomedical Research to attend ECCB'12, Switzerland, 2012
- PhD scholarship from The Darwin Trust of Edinburgh, UK, 2011-2014
- Silver medal in M.Tech. Bioinformatics, SHIATS, India, 2010

KEY SCIENTIFIC SKILLS

<i>Computational Biology</i>	<i>Experimental techniques</i>	<i>Computational skills</i>	<i>Data Science and Machine Learning</i>
Structure prediction Active site architecture analysis Protein/ligand docking Protein interface analysis Molecular dynamics simulation Sequence analysis and general bioinformatics <ul style="list-style-type: none">• Machine learning• Co-evolution analysis• Evolutionary trace analysis	Molecular biology <ul style="list-style-type: none">• PCR• Gibson assembly• Restriction digestion• Plasmid Transformation• Plasmid and PCR product purification General microbiology techniques HPLC, Overlay bio-assays	Operating systems <ul style="list-style-type: none">• GNU/Linux, Windows, Mac Programming/scripting languages <ul style="list-style-type: none">• C++, Perl, Python, R• Java Script, HTML & CSS• SQL LaTeX, HPC Network protocols and file management Content management systems	Data analysis <ul style="list-style-type: none">• Numpy, Pandas Data visualization <ul style="list-style-type: none">• Matplotlib, Seaborn, Plotly & Cufflinks Machine Learning <ul style="list-style-type: none">• SciKit Learn• Keras• Tensorflow

OTHER SKILLS TRAINING

- Jun 2012 **Leading Academics**, Leadership development program, University of Birmingham, UK
 - *Attended a week long workshop on academic leadership through lectures and interactive sessions with leaders from University of Birmingham and other organisations in the UK.*
- Apr 2012 **One day course on Poster Presentations: Planning the Content**, University of Birmingham, UK
- Feb 2012 **Talent Pool**, Training program on entrepreneurship, University of Birmingham, UK

- *Attended a month long training programme on ideas generation, business planning and strategy, personal effectiveness, networking, team-working, presentation and pitching skills, consulting skills and commercial awareness.*

Jan 2012 **One day course on Speed Reading**, University of Birmingham, UK

Oct 2011 **One day course on Time Management**, University of Birmingham, UK

CONFERENCES ATTENDED & ORGANISED

- Oct 2015 National Conference on Bioinformatics Panorama in Agriculture and Health, Allahabad, India, **Sponsor Liaison, Organising Committee**
- Oct 2014 1st RSG-UK Student Symposium on Computational Biology and Life Sciences, Pontypridd, Wales, **Secretary, Organising Committee**
- Sep 2014 Synthetic biology of antibiotic production II, Sant Feliu de Guixols, Spain, **Short Talk**
- Jul 2014 The 28th Annual Symposium of The Protein Society, San Diego, USA, **Poster Presentation**
- Nov 2013 15th EMBL PhD Symposium, Heidelberg, Germany, **Short Talk**
- Jul 2013 ISMB/ECCB'13, Berlin, Germany, **Poster Presentation**
- May 2013 Molecular Perspectives On Protein-Protein Interactions, Pultusk, Poland, **Poster Presentation**
- Sep 2012 ECCB'12 - 11th European Conference on Computational Biology, Basel, Switzerland, **Poster Presentation**
- Jun 2012 3rd BEAR Postgraduate Conference on Research Computing, University of Birmingham, **Secretary and Sponsor Liaison, Organising Committee**
- Jan 2010 The Eighth Asia Pacific Bioinformatics Conference, Bangalore, India, **Poster Presentation**
- Nov 2009 National Workshop on Functional Genomics and Proteomics, Bhubaneswar, India
- Mar 2009 International Conference on Open Source for Computer Aided Drug Discovery, Chandigarh, India, **Poster Presentation**

PROFESSIONAL MEMBERSHIPS

- The Protein Society (2013-2014)
- International Society for Computational Biology (ISCB) (2012-2015)
- Biochemical Society (2012-2015)

EXTRA CURRICULAR POSITIONS HELD

- Co-Founder and Secretary, Regional Student Group, UK, Student Council, ISCB, 2013-2014
- Secretary, Bharat Parivar, Guild of Students, University of Birmingham, 2011-2012
- Vice president for Society of Biotechnology, SHIATS, 2009-2010

PERSONAL/CONTACT INFORMATION

DOB: 15 July 1984
Marital status: Married
Nationality: Indian

Mailing Address
 2028 C Brauer Hall,
 1 Brookings Drive,
 Washington University in St. Louis,
 St. Louis 63130, Missouri, USA

APPENDIX A

PUBLICATIONS (Google Scholar: h-index 7 | i10-index 5)

BOOK CHAPTER

1. **Farmer R***, Thomas CM, Winn PJ*, Modelling Polyketide Synthases and Similar Macromolecular Complexes, Current trends in Bioinformatics: an Insight, Chapter: 7, Gulshan Wadhwa, Jayesh Bellare, Atul Kumar Singh, P. Shanmughavel (Eds.). (In Press, Publisher: Springer-Verlag, Germany)

IN PREPARATION

1. **Farmer R**, Thomas CM, Winn PJ, Molecular dynamics simulation on mutant Type I PKS ACP reveals adoption of a substrate sequestering mechanism similar to FAS ACP, (Manuscript under preparation).

PUBLISHED

1. Konda AK, **Farmer R**, Soren KR, P S S, Setti A. Structural modelling and molecular dynamics of a multi-stress responsive WRKY TF-DNA complex towards elucidating its role in stress signalling mechanisms in chickpea. **J Biomol Struct Dyn**. 2017 Jul 28;1-13. PubMed PMID: 28679078.
2. Khanim F, Davies N, Veliça P, Hayden R, Ride R, Pararasa C, Chong G, Gunther U, Veerapen N, Winn P, **Farmer R**, Davies P, Trivier E, Rigoreau L, Drayson M, Bunce C. Selective AKR1C3 inhibitors do not recapitulate the anti-leukaemic activities of the pan-AKR1C family inhibitor medroxyprogesterone acetate. **British Journal of Cancer**. 2014 Mar 18;110(6):1506-16. doi: 10.1038/bjc.2014.83. Epub 2014 Feb 25. PubMed PMID: 24569460.
3. Lodhi SS, **Farmer R**, Singh AK, Jaiswal YK, Wadhwa G. 3D structure generation, virtual screening and docking of human Ras-associated binding (Rab3A) protein involved in tumourigenesis. **Molecular Biology Reports**. 2014 Jun;41(6):3951-9. doi:10.1007/s11033-014-3263-x. Epub 2014 Mar 21. PubMed PMID: 24652202.
4. Haines AS, Dong X, Song Z, **Farmer R**, Williams C, Hothersall J, Płoskoń E, Wattana-amorn P, Stephens ER, Yamada E, Gurney R, Takebayashi Y, Masschelein J, Cox RJ, Lavigne R, Willis CL, Simpson TJ, Crosby J, Winn PJ, Thomas CM, Crump MP. A conserved motif flags acyl carrier proteins for β -branching in polyketide synthesis. **Nature Chemical Biology**. 2013 Nov;9(11):685-92. doi: 10.1038/nchembio.1342. Epub 2013 Sep 22. PubMed PMID: 24056399; PubMed Central PMCID: PMC4658705.
5. Singh S, Sablok G, **Farmer R**, Singh AK, Gautam B, Kumar S. Molecular dynamic simulation and inhibitor prediction of cysteine synthase structured model as a potential drug target for trichomoniasis. **Biomed Research International**. 2013;2013:390920. doi:10.1155/2013/390920. Epub 2013 Sep 1. PubMed PMID: 24073401; PubMed Central PMCID: PMC3773994.
6. Paital B, Kumar S, **Farmer R**, Chainy GB. *In silico* prediction of 3D structure of Mn superoxide dismutase of *Scylla serrata* and its binding properties with inhibitors. **Interdisciplinary Sciences - Computational Life Sciences**. 2013 Mar;5(1):69-76. doi: 10.1007/s12539-013-0150-4. Epub 2013 Apr 19. PubMed PMID: 23605642.
7. Kumar S, **Farmer R**, Turnbull AP, Tripathy NK, Manjasetty BA. Structural and functional conservation profiles of novel cathepsin L-like proteins identified in the *Drosophila melanogaster* genome. **Journal of Biomolecular Structure and Dynamics**. 2013 Dec;31(12):1481-9. doi: 10.1080/07391102.2012.745379. Epub 2012 Dec 21. PubMed PMID: 23256878.
8. Gautam B, Singh G, Wadhwa G, **Farmer R**, Singh S, Singh AK, Jain PA, Yadav PK. Metabolic pathway analysis and molecular docking analysis for identification of putative drug targets in

- Toxoplasma gondii*: novel approach. **Bioinformation**. 2012;8(3):134-41. Epub 2012 Feb 3. PubMed PMID: 22368385; PubMed Central PMCID: PMC3283885.
9. Fazil MH, Kumar S, **Farmer R**, Pandey HP, Singh DV. Binding efficiencies of carbohydrate ligands with different genotypes of cholera toxin B: molecular modeling, dynamics and docking simulation studies. **Journal of Molecular Modeling**. 2012 Jan;18(1):1-10. doi: 10.1007/s00894-010-0947-6. Epub 2011 Mar 16. PubMed PMID: 21409571.
 10. Kumari S, Shridhar S, Singh D, **Farmer R**, Hundal J, Priya P, Sharma P, Bhavishi K, Schrick K, and Yadav G. The role of lectins and HD-ZIP transcription factors in Isoprenoid based plant stress responses. **Proceedings of Indian National Science Academy**. 2012;78(4):671-691.
 11. Lodhi, S.S., **Farmer R.**, Singh, A.K., Wadhwa, M., Jaiswal, Y.K., Wadhwa, G. Statistical analysis of differential gene expression profile for colon cancer, **Indian Journal of Biotechnology**. 2012;11(4):396-403.
 12. Paital B, Kumar S, **Farmer R**, Tripathy NK, Chainy GB. *In silico* prediction and characterization of 3D structure and binding properties of catalase from the commercially important crab, *Scylla serrata*. **Interdisciplinary Sciences - Computational Life Sciences**. 2011 Jun;3(2):110-20. doi: 10.1007/s12539-011-0071-z. Epub 2011 May 4. PubMed PMID: 21541840
 13. Jeyakumar E, Lawrence R, **Farmer R**. Sahai S. In vitro and in silico analysis of Xylanase produced by *Bacillus licheniformis*. **Applied Biological Research**. 2011; 13 (1): 17-27.
 14. **Farmer R***, Gautam B, Singh S, Yadav PK, Jain PA. Virtual screening of AmpC/ β -lactamase as target for antimicrobial resistance in *Pseudomonas aeruginosa*. **Bioinformation**. 2010 Jan 17;4(7):290-4. PubMed PMID: 20978601; PubMed Central PMCID: PMC2957765.

NON – PEER REVIEWED/PREPRINT

1. Rahman F, **Farmer R**, Das S, Vayani F, Hassan M. Highlights of the 1st Student Symposium of the ISCB RSG UK. F1000Res. 2015 Jun 16;4:154. doi:10.12688/f1000research.6616.1. eCollection 2015. PubMed PMID: 26998223; PubMed Central PMCID: PMC4786907.

*** Corresponding Author**