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Academic Experience

Group Leader University of Bayreuth (UBT), Germany 05.2022-present

Current projects

- Understanding the molecular basis for the interaction of collagens with other proteins, most notably discoidin domain receptors, integrins and Von Willebrand Factor.
- Investigating how collagen and collagen-like proteins fold across archaea, bacteria, eukaryote and viruses.
- Correlating phenotypic severity of heritable collagen-related diseases to the location of mutations along the collagen sequence.
- Understanding how collagen-like proteins in bacteria promote biofilm formation, its structural consequences and ways to intervene.

DFG (German Research Foundation) Postdoctoral Fellow UBT (€575,470; 3 years) 01.2019-04.2022

Advisor – Birte Höcker
Title – Folding and dynamics of protein chimeras built from two different folds
Contribution – Independently performed all experiments to generate preliminary results and wrote the complete proposal. The grant was awarded with a postdoc, PhD and technician positions. This is unprecedented and testifies to the quality of grant, given that DFG generally only funds one position per proposal.
Outcome – 1 first author publication, 1 in preparation

Humboldt Postdoctoral Fellow, UBT (€79,500; 2 years) 08.2017-12.2019

Advisor – Birte Höcker
Title – Folding Mechanism of Protein Chimeras Containing Fragments of Two Different Protein Folds
Contribution. independently conceived the project and wrote the grant with edit inputs from PI
Outcome – DFG position succeeded this fellowship

Newton International Fellow, University of Cambridge (£75,068; 2 years) 07.2015-07.2017

Advisor – Richard Farndale
Title – Designing a Toolkit Peptide Llibrary for the Heterotrimeric Collagen Types I, IV and VI
Contribution. independently conceived the project and wrote the grant with edit inputs from PI
Outcome – Jalan et al, Nature Chemical Biology (2020)

Parental leave to start a family 06.2014-06.2015

Two children born in 2015 and 2019.

PhD (Chemistry), Welch Foundation Predoctoral Fellow, Rice University 08.2009-05.2014

Advisor – Jeffrey Hartgerink
Title – Design of Heterotrimeric Collagen Triple Helices
Outcome – 11 research articles; 4 first author and 2 second author

MS (Thesis in Chemistry), Syracuse University 08.2006-07.2009

Advisor – Tewodros Asefa
Title – Development of organically and inorganically functionalized nanoporous silica and investigations into their catalytic and material applications.
Outcome – 7 research articles and 2 book chapters; 2 first author and 2 second author

MSc (Inorganic Chemistry), University of Delhi, New Delhi, India 07.2003-05.2005

Development of cloud point methodology for sequestration of heavy metal ions from sewage water

BSc (Chemistry with Honours), University of Delhi, New Delhi, India 07.2000-06.2003

Research articles *(times cited = 1244; h-index = 17, i10-index=19, Google Scholar 30.09.2023)*
** corresponding author*

1. JD Malcor, N Ferruz, S Romero-Romero, S Dhingra, V Sagar, **AA Jalan*** (2024) Code for collagen folding deciphered **bioArxiv**, available from doi.org/10.1101/2024.02.24.581883 **under review in Nat Comm**
2. **AA Jalan**, L Hassine, S Romero-Romero, J Hübner, K Schweimer, B Höcker (2023) Hydrophobic clusters direct folding of a synthetic chimeric protein. **bioArxiv**, available from doi.org/10.1101/2023.09.29.560087
3. SAH Hulgan, **AA Jalan**, I-Che Li, DR Walker, MD Miller, AJ Kosgei, W Xu, GN Phillips, JD Hartgerink* (2020) Covalent capture of collagen triple helices using lysine – aspartate and lysine – glutamate pairs. **Biomacromolecules** 21: 3772-81
4. **AA Jalan***, D Sammon, JD Hartgerink, P Brear, K Scott, SW Hamai, EJ Hunter, DR Walker, B Leitinger, RW Farndale (2020) Chain alignment of collagen I deciphered using computationally designed heterotrimers. **Nat Chem Biol** 16: 423-29
5. I-Che Li, SAH Hulgan, DR Walker, RW Farndale, JD Hartgerink*, **AA Jalan*** (2019) Covalent Capture of Heterotrimeric Collagen Helix. **Org Lett** 21: 5480-84
6. VA Kumar, NL Taylor, S Shi, BK Wang, **AA Jalan**, MK Kang, NC Wickremasinghe, JD Hartgerink* (2015) Highly Angiogenic Peptide Nanofibers. **ACS Nano** 9: 860-68
7. VA Kumar, S Shi, BK Wang, I-Che Li, **AA Jalan**, B Sarkar, NC Wickremasinghe, JD Hartgerink* (2015) Drug-Triggered and Cross-linked Self-assembling Nanofibrous Hydrogels. **J Am Chem Soc** 137: 4823-30
8. AM Acevado-Jake, **AA Jalan**, JD Hartgerink* (2015) Comparative NMR Analysis of Collagen Triple Helix Organization from N- to C-Termini. **Biomacromolecules** 16: 145-55
9. VA Kumar, NL Taylor, **AA Jalan**, LK Hwang, BK Wang, JD Hartgerink* (2014) A Nanostructured Synthetic Collagen Mimic for Hemostasis. **Biomacromolecules** 15: 1484-90
10. **AA Jalan**, K. Jochim, JD Hartgerink* (2014) Rational Design of a Sticky-ended Collagen Triple Helix with a Non-Canonical Offset. **J Am Chem Soc** 136: 7535-38
11. **AA Jalan**, B Demeler, JD Hartgerink* (2013) Hydroxyproline-free Single Composition ABC Collagen Heterotrimer. **J Am Chem Soc** 135: 6014-17
12. •**AA Jalan** & JD Hartgerink* (2013) Simultaneous Control of Composition and Register of an AAB-type Collagen Heterotrimer. **Biomacromolecules** 14: 179-85
13. JA Fallas, MA Lee, **AA Jalan**, JD Hartgerink* (2012) Rational Design of Single-Composition ABC Collagen Heterotrimers. **J Am Chem Soc** 134: 1430-33
14. G Jonathan, **AA Jalan,** S Jones, CR Hine, R Alam, S Garai, M Maye, A Muller, J Zubieta* (2014) Keplerate Cluster (Mo-132) Mediated Electrostatic Assembly of Nanoparticles **J Coll Int Sci** 432: 144-50
15. EV Dikarev, DK Kumar, AS Filatov, **A Anan**, Y Xie, T Asefa, MA Petrukhina* (2010) Recyclable Dirhodium Catalysts Embedded in Nanoporous Surface-functionalized Organosilica Hosts for Carbenoid-mediated Cyclopropanation Reactions. **ChemCatChem** 2: 1461-66
16. Y Xie, KK Sharma, **A Anan**, G Wang, A Biradar, T Asefa* (2009) Efficient Solid-base Catalysts for

Aldol Reaction by Optimizing the Density and Type of Organoamine Groups on Nanoporous Silica. **J Catal** 265: 131-40

17. **A Anan**, KK Sharma, T Asefa* (2008) Selective Efficient Nanoporous Catalysts for Nitroaldol Condensation: Co-placement of Multiple Site-isolated Functional Groups on Mesoporous Materials. **J Mol Catal A: Chem** 288: 1-13 **(Editor's Choice Article)**
18. **A Anan**, R Vathyam, T Asefa* (2008) Controlled Synthesis of the Henry Reaction Products: Nitroalcohol Versus Nitrostyrene by a Simple Change of Amino-Groups of Aminofunctionalized Nanoporous Catalysts. **Catal Lett** 126: 142-148
19. KK Sharma, **A Anan**, RP Buckley, W Ouellette, T Asefa* (2008) Towards Efficient Nanoporous Catalysts: Controlling Site-isolation and Concentration of Grafted Catalytic Sites on Nanoporous Materials with Solvents and Colorimetric Elucidation of their Site-isolation. **J Am Chem Soc** 130: 218-228
20. Z Tao, MP Morrow, KK Sharma, C Duncan, **A Anan**, T Asefa, HS Penefsky, J Goodisman*, A Kader* (2008) Mesoporous Silica Nanoparticles Inhibit Cellular Respiration. **Nano Lett** 8: 1517-1526

Review articles

21. **AA Jalan** & JD Hartgerink* (2013) Pairwise Interactions in Collagen and the Design of Heterotrimeric Helices. **Curr Opin Chem Biol** 17: 960-967

Book chapters

22. T Asefa, **A Anan**, CT Duncan, Y Xie (2009) Functionalized Nanoporous and Mesoporous Heterogeneous Catalysts – New Synthetic Strategies and Applications**.** Invited chapter in **Heterogeneous Catalysis Research Progress** (Nova Publishers) Chapter 2: 81-110
23. T Asefa, **A Anan**, CT Duncan, Y Xie (2009) Spherical and Anisotropic Non-Magnetic Core-Shell Nanomaterials: Synthesis and Characterization. Invited chapter in **Nanomaterials for the Life Sciences** (Wiley-VCH) Volume 3, Chapter 9: 281-330
24. T Asefa, KK Sharma, **A Anan**, R Vathyam, RP Buckley, HM Dam, Y Xie, S Quinlivan, G Wang, CT Duncan (2008) Efficient and Selective Nanoporous Catalysts by Placing Multiple Site-isolated Functional Groups on Mesoporous Materials. Invited chapter in **Nanoporous Materials** (World Scientific Publication Co., Singapore) 497-508.

Posters, presentations and conferences

1. **Invited talk,** "Deciphering the code for collagen folding", FI Engineering Molecular Systems Colloquim, University of Heidelberg (Germany), 2023
2. **Poster,** "Deciphering the code for collagen folding", Gordon Research Conference in Chemistry and Biology of Peptides 2022
3. **Invited talk,** "Molecular clamps chaperone collagen folding", Bayreuther Zentrum für Molekulare Biowissenschaften (BZMB) Seminar (2022), University of Bayreuth, Bayreuth, Germany
4. **Selected talk,** "Molecular clamps chaperone collagen folding", Alpbach Conference on Coiled-Coils 2022, Alpbach, Austria
5. **Selected talk**, "Evolutionary and Design Perspective on Protein Chimeragenesis" at Volkswagen Foundation Protein Evolution Workshop (2021), University of Bayreuth, Bayreuth, Germany
6. **Selected talk**, "Protein Chimeras: More or Less than the Sum of Parts" at Gordon Research Seminar in Protein Folding (2020) Galveston TX USA
7. **Poster** "Protein Chimeras: More or Less than the Sum of Parts" at Gordon Research Conference in Proteins (2019) Holderness, NH USA

8. **Invited talk**, “Folding and Dynamics of a Designed Chimera”, Bayreuther Zentrum für Molekulare Biowissenschaften (BZMB) Seminar (2019), University of Bayreuth, Bayreuth, Germany
9. **Selected talk**, “Folding and Conformational Dynamics of a Chimeric Protein”, BioMac Seminar (2018), University of Bayreuth, Germany
10. **Selected talk**, “Unequal Marriage of Protein Fragments in a Chimera” at Molecular Biosciences Retreat (2018) Lichtenfels Germany
11. **Invited talk*** “Towards Design of Heterotrimeric Toolkit Library and Implications for Chain Registration in Collagen I” at Gordon Research Conference in Collagen (2017) New London NH USA, *could not attend due to visa delay
12. **Selected** as a fully sponsored participant to the 50th Course ERICE Integrative Structural Biology (2017) Erice, Italy
13. **Selected talk** titled “Hydroxyproline-free Single Composition ABC-type Collagen Heterotrimer” at ACS National Meeting (2013), New Orleans LA USA
14. **Selected talk** titled “Tackling Diverse Problems in the Design of Collagen Mimetic Peptides with Salt-bridge Interaction” at Gordon Research Seminar in Collagen (2013), New London NH USA. Talk also selected for presentation at the Gordon Research Conference in Collagen
15. **Poster titled** “Rational Design of a Non-canonical "Sticky-ended" ABC-Collagen Triple Helix” at Gordon Research Conference in Chemistry & Biology of Peptides (2014), Ventura CA USA

Speakers hosted at the University of Bayreuth

1. **Dr. Birgit Letinger,** Reader in Matrix Receptor Signalling, Faculty of Medicine, National Heart & Lung Institute, Imperial College London. **“**Collagen sensing: How discoidin domain receptors transmit a signal across the membrane and control kinase activity” 18.02.2022
2. **Dr. Franziska Thomas,** Junior Group Leader, Organisch-Chemisches Institut, University of Heidelberg “Engineering the function of β-sheet miniproteins” 15.11.2022
3. **Dr. Wing Ying Chow,** Assistant Professor, Department of Physics, University of Warwick**,** UK

Fellowship, award and recognitions

2018 – 2023	**Newton Alumni Fellowship**, Royal Society, UK £6000 per year for five years (Develop and sustain collaborations in the United Kingdom)
2017 – 2019	**Humboldt Postdoctoral Fellowship**, Humboldt Stiftung, Germany (Höcker Protein Design Group, University of Bayreuth)
2015 – 2017	**Newton International Fellowship**, The Royal Society, UK (Farndale Matrix Biology Group, University of Cambridge)
2014	**Harry B. Weiser Research Award**, Rice University (In recognition of outstanding doctoral thesis research)
2010-2014	**Robert A. Welch Foundation Predoctoral Fellowship**, Rice University (Financial support for doctoral research)
2011	**Harry B. Weiser Teaching Award**, Rice University (In recognition of outstanding performance as a teaching assistant)
2011	**Stephen C. Hoffman Early Achievement Fellowship**, Rice University (In recognition of outstanding achievement in the first 2 years of doctoral research)
2009	**William D. Johnson Teaching Award**, Syracuse University (In recognition of outstanding performance as a teaching assistant)

Supervision of students

2017-2018	Julian Hubner (MS Thesis) *Title: Structure and folding mechanism of CheYHisF chimeras*
2018-2019	Farid Lukas Hassine (MS Thesis) *Title (tentative): Design, structure and folding of protein chimeras*
2019-present	Farid Lukas Hassine (PhD), University of Bayreuth *Title (tentative): Design, structure and folding of protein chimeras*
06.2023-08.2023	Rounak Mukhopadhyay (DAAD-WISE fellow, UBT) *Title. New strategy for reversible covalent capture of collagen triple helices*
2023-2024	Vamika Sagar (MS Thesis) *Title. Molecular basis for the stability of prokaryotic collagens*
2023-2024	Lukas Jaegers (MS Thesis) *Title: Molecular basis for the collagen-binding specificity of discoidin domain receptors*
2023-2024	Mateo Giraldo Ceballos (Advanced Research Module) *Title: Mechanism of reversible interchain covalent bond formation in triple helices*

Reviewer *(https://www.webofscience.com/wos/author/record/1428420)*

- Nature Structural & Molecular Biology
- Biomacromolecules
- Journal of Materials Chemistry B
- Computational and Structural Biology Journal
- RSC Chemical Biology
- BMC Biotechnology

Teaching experience

At University of Bayreuth

1. General Inorganic Chemistry — Winter Semester'20
   (~20 undergraduate students, 3 hours per week)
   role: supervise 1 laboratory experiment per week
2. Seminar Course in Self-assembling Biopolymers — Winter Semester'22
   (~20 undergraduate students, 3 hours per week)
   role: design course material, moderate seminars and evaluate student presentations
3. Seminar Course in Biomaterial for Engineers — Winter Semester'22
   (~20 MS students, 2 hours per week, course instructor)
   role: design course material, moderate seminars and evaluate student presentations
4. Seminar Course in Innovation Management — Winter Semester'23
   (~20 MS students, 2 hours per week, co-instructed course)
   role: evaluate student presentations
5. Practical Course in Self-assembling Biopolymers — Summer Semester'23
   (~20 MS students, 2 hours per week, co-instructed course)
   role: supervise 1 laboratory course per week
6. Seminar Course in Self-assembling Biopolymers — Summer Semester'23
   (~20 MS students, 2 hours per week, course instructor)

role: design course material, moderate seminars and evaluate student presentations

7. Seminar Course in Biomaterials — Summer Semester'23
   (~20 MS students, 2 hours per week, course instructor)
   role: design course material, moderate seminars and evaluate student presentations

At Rice University,

8. Chemistry 215: Organic Chemistry Laboratory — Spring 2010-11
   (40 students, 2 credit hours, Teaching assistant)
9. Chemistry 123: General Chemistry Laboratory — Fall 2009
   (40 students, 2 credit hours, Teaching assistant)

At Syracuse University

10. Chemistry 276: Organic Chemistry Laboratory — Fall 2007-08
    (40 students, 2 credit hours, Teaching assistant)
11. Chemistry 117: General Chemistry Laboratory — Spring 2007
12. Chemistry 107: General Chemistry Laboratory — Fall 2006

Other experiences

iCanToo

- Co-founder non-profit organization *iCanToo* that provides cost-free expert scientific advice, training and materials to underprivileged schools in India.
- Organized Wall Art Festival in Khagaria (India) in 2015 inviting more than 10 graffiti, graphic, tribal and modern artists and 30 volunteers from India, Japan and Germany to work with 700 school children over 1 month to create more than 10,000 square feet of Wall Art. https://www.youtube.com/watch?v=ZCV6y9GXG_c
- Wrote a successful proposal to get free paper microscopes (called Foldscopes) from Stanford University, USA and freely distributed and trained school teachers in India in use of these.
- Currently, working on procuring old and soon-to-be-disposed lab equipments such as pipettes, pH-meters, glassware etc from laboratories, recycle these and distribute free-of-cost to schools in rural India.

Referees

1. **Jeffrey D. Hartgerink (jdh@rice.edu)**
Doctoral supervisor
Professor of Chemistry and Bioengineering
Rice University, Houston (TX), USA
319 BioScience Research Collaborative | 713-348-2101

2. **Richard W. Farndale (rwf10@cam.ac.uk)**
Postdoctoral supervisor
Emeritus Professor of Matrix Biology
Department of Biochemistry
University of Cambridge (UK)

3. **Dr. Birgit Leitinger (b.leitinger@imperial.ac.uk)**
Collaboration partner
Reader of Matrix Receptor Signalling
Faculty of Medicine, National Heart & Lung Institute
Imperial College London, London (UK)