Rajan Lamichhane, Ph.D.

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Biochemistry & Cellular and Molecular Biology
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EDUCATION

Ph.D. Chemistry, Wayne State University, Detroit, MI 2011

M.Sc. Inorganic Chemistry, Tribhuvan University, Kathmandu, Nepal 2001

B.Sc. Chemistry and Biology, Tribhuvan University, Kathmandu, Nepal 1998

ACADEMIC AND RESEARCH APPOINTMENTS

Assistant Professor: 2018 – Present
Department Biochemistry & Cellular and Molecular Biology,
University of Tennessee, Knoxville, TN

Visiting Scholar: 2017 – 2018
School of Pharmacy & Pharmaceutical Sciences
University of California, San Diego, San Diego, CA

Postdoctoral Associate: 2011 – 2018
Department of Integrative Structural and Computational Biology
The Scripps Research Institute, La Jolla, CA
Mentor: Professor David P. Millar

Graduate Assistant: 2005 – 2010
Department of Chemistry
Wayne State University, Detroit, MI
Advisor: Professor David Rueda

Teaching Assistant: 2004 – 2005
Department of Chemistry and Biochemistry
University of Texas at Arlington, Arlington, TX

Research Assistant: 2002 – 2004
Department Chemistry
Sun Moon University, Asan, Korea (ROK)
Advisor: Professor Sohng J. Kyung

Lecturer: 2001 – 2002
Department of Chemistry, Amrit Science College
Tribhuvan University, Kathmandu Nepal

GRANTS AND FELLOWSHIPS

1. California HIV/AIDS Research Program (CHRP) Postdoctoral Training Award 2013 – 2015

AWARDS AND LEADERSHIP ACTIVITIES

1. Travel Award: Gordon Research Conferences: Single Molecule Approaches to Biology 2008
2. Member: T. T. Tchen Memorial Seminar Series Organizing Committee, Chemistry Department, Wayne State University (WSU) 2010
3. Student Advisor: Chemistry Graduate Research Symposium Organizing Committee, WSU 2008

4. Chair: Chemistry Graduate Research Symposium Organizing Committee, WSU 2007
5. Member: Chemistry Graduate Research Symposium Organizing Committee, WSU 2006

PEER-REVIEWED PUBLICATIONS

1. Hammond, J.A., Zhou, L., **Lamichhane, R.**, Chu, HY., Millar, D.P., Gerace, L., and Williamson, J.R. A Survey of DDX21 activity during Rev/RRE complex formation. *J Mol Biol,* **2017**, 430, 537-553.
2. **Lamichhane, R.**, Liu J.J., Pauszek, R.F III, and Millar, D.P. Monitoring conformational changes in a G protein-coupled receptor at the single-molecule level using a Cy3 fluorescence probe. *Bio-protocol*, **2017**, 7, 12, e2332.
3. **Lamichhane, R.,** Hammond, J.A., Pauszek, R.F. III, Anderson, R., Pedron, I., van der Schans, E., Williamson, J.R., and Millar, D.P. The DEAD-Box protein DDX1 acts through RNA to promote HIV-1 Rev-RRE assembly. *Nucleic Acids Res,* **2017,** 45, 4632-4641.
4. Hammond, J.A., **Lamichhane, R.,** Millar, D.P., and Williamson, J.R., A DEAD-box helicase mediates an RNA structural transition in the HIV-1 Rev response element. *J Mol Biol*, **2017**, 429, 697-714.
5. **Lamichhane, R.,** Mukherjee, S., Smolin, N., Pauszek, R., Bradley, M., Sastri, J., Robia, S.L., Millar, D.P., and Campbell, E.M. Conformational changes in the rhesus TRIM5α dimer dictate the potency of HIV-1 restriction. *Virology,* **2017**, 500, 161-68.
6. Baker, K.A.*, **Lamichhane, R.***, Rueda, D., and Cunningham, P.R. Protein-RNA dynamics in the central junction control 30S ribosome assembly. *J Mol Biol*, **2016**, 428, 3615-31. (***** Equal Authorship)
7. Lavergne, T.*, **Lamichhane, R.*,** Malyshev, D., Li, Z., Li, L., Sperling, E., Williamson, J., Millar, D., and Romesberg, F. FRET characterization of complex conformational changes in a large 16S ribosomal RNA fragment site-specifically labeled using unnatural base pairs. *ACS Chem Biol*, **2016**, 11, 1347-53. (***** Equal Authorship)
8. **Lamichhane, R**.* Liu J.J.*, Pljevaljcic, G., van der Schans, E., Katritch, V., Wüthrich, K., Stevens, R.C., and Millar, D.P. Single-molecule view of basal activity and activation mechanisms of the G protein-coupled receptor β_2AR. *PNAS*, **2015**, 112, 14254-59. (***** Equal Authorship) (featured in TSRI News and Views)
9. **Lamichhane, R**., Berezhna, S.Y., Gill, P.J., Van der Schans, E., and Millar, D.P. Dynamics of site switching in DNA polymerase I. *JACS,* **2013,** 135, 4735-42.
10. Berezhna, S.Y., Gill, J., **Lamichhane, R**., and Millar, D.P. Single-molecule FRET reveals an innate fidelity checkpoint in DNA polymerase I. *JACS,* **2012,** 134, 11261-68.
11. Salim, N.*, **Lamichhane, R.*,** Zhao, R., Banarjee, T., Philip, J., Rueda, D., and Feig, A.L. Thermodynamic and kinetic analysis of an RNA kissing interaction and its resolution into an extended Duplex. *Biophysical Journal,* **2012,** 102, 1097-1106. (***** Equal Authorship)
12. Zhao, R., Marshall, M., Aleman, E., **Lamichhane, R**., Feig, A., and Rueda, D. Laser-induced single-molecule temperature jump. *Biophysical Journal,* **2010,** 99, 1925-31.
13. **Lamichhane, R**., Solem, A., Black, W., and Rueda, D. Single molecule FRET of nucleic acid-protein and protein-protein interactions: surface passivation and immobilization. *Methods,* **2010,** 52, 192-200.
14. **Lamichhane, R.,** Daubner, G., Thomas-Crusells, J., Auweter, S.D., Manatchal, C., Austin, K.S., Vaniuk, O., Allain, F.H., and Rueda, D. RNA looping by PTB: evidence using FRET and NMR spectroscopy and for a role in splicing repression. *PNAS***, 2010,** 107, 4105-10 (featured by faculty of 1000).
15. Aleman, E. A., **Lamichhane, R**., and Rueda, D. Exploring RNA folding one molecule at a time. *Curr Opin Chem Biol,* **2008,** 12, 647-54.
16. Thuy, M.L., Kharel, M.K., **Lamichhane**, **R**., Lee, H.C., Suh, J.W., Liou, K.K., and Sohng, J.K. Expression of 2-deoxy-scyllo-inosose synthase (kanA) from kanamycin gene cluster in *Streptomyces lividans. Biotechnology Letters* **2005**, 27, 465-70.
17. Sthapit, B., Oh, T.J., **Lamichhane**, **R**., Liou, K.K., Lee, H.C., Kim, C.G., and Sohng, J.K. Neocarzinostatin naphthoate synthase: an unique iterative type I PKS from neocarzinostatin producer *Streptomyces carzinostaticus. FEBS Letters* **2004**, 566, 201-6.

BOOK CHAPTERS

1. **Lamichhane, R.** How proteins recognize RNA. In "Biophysics of RNA-Protein Interactions. Biological and Medical Physics, Biomedical Engineering. Joo, C. & Rueda, D. (eds). *Springer* **2019**, New York, NY, 3-21.

INVITED TALKS/ PLATFORM PRESENTATIONS

1. Annual Fall Meeting of the Appalachian Regional Microscopy Society (AReMS), Knoxville, TN (**2018**)
   Title: Visualizing protein action at the single-molecule level.
2. Department of Pharmacology and Experimental Therapeutics, Loyola University, Chicago, IL (June 29, **2015**).
   Title: Visualizing protein function at the single-molecule level.
3. 59th Annual Biophysical Society Meeting, Baltimore, Maryland (**2015**).
   Title: Conformational dynamics of a G protein-coupled receptor at the single-molecule level.
4. 57th Annual Biophysical Society Meeting, Philadelphia, Pennsylvania (**2013**).
   Title: Dynamics of site switching in DNA polymerase.
5. RNA Club Meeting, The University of California San Diego (UCSD), San Diego, CA (August 10, **2012**).
   Title: Assembly of HIV-1 Rev on the Rev response element (RRE): One molecule at a time.
6. Center for Nonlinear Studies, Los Alamos National Lab, Los Alamos, NM (November 08, **2010**).
   Title: Study of protein-RNA interactions by using fluorescence resonance energy transfer (FRET) and single-molecule FRET (smFRET).
7. Rustbelt RNA Meeting, Mt. Sterling, OH (**2009**).
   Title: RNA looping by PTB: Evidence for a role in splicing repression.
8. 9th Michigan RNA Society Meeting, An Arbor, MI (**2007**).
   Title: Probing the mechanism of alternative splicing regulation by PTB with FRET.

SELECTED POSTER PRESENTATIONS (National and International Meetings)

1. Single-molecule studies of HIV-1 Gag Assembly.
   Structural Biology Related to HIV/AIDS, **2017.**
2. A Dead-Box protein acts through RNA to promoteHIV-1 Rev-RRE Assembly.
   Biophysical Society, 2017.
3. Role of Dead-box protein DDX1 in assembly of Rev-RRE nuclear export complexes.
   Structural Biology Related to HIV/AIDS, **2016.**
4. Mechanism of the DDX1 assisted assembly of Rev on the Rev responsive element.
   Structural Biology Related to HIV/AIDS, **2015.**
5. Assembly of Rev and cofactor DDX1 on the Rev responsive element.
   Structural Biology Related to HIV/AIDS, **2014.**
6. Role of DEAD Box helicases in HIV-1 Rev function: A Single-molecule approach.
   Biophysical Society, **2014.**
7. Single-molecule studies of HIV-1 Rev assembly on the Rev response element.
   Structural Biology Related to HIV/AIDS, **2013.**
8. Oligomeric assembly of HIV-1 Rev on the Rev response element: Role of cellular cofactors. **Structural Biology Related to HIV/AIDS**, **2012.**
9. Oligomeric assembly of HIV-1 Rev on the Rev response element: Role of cellular cofactors.
   RNA Society, **2012.**
10. Oligomeric Assembly of HIV-1 Rev on the Rev response element: Role of cellular cofactors. **Biophysical Society**, **2012.**
11. Alternative splicing regulation through RNA looping.

Biophysical Society, **2010.**

12. Evidence of RNA looping by PTB using Fluorescence Resonance Energy Transfer and NMR spectroscopy.

    RNA Society, **2009.**

13. Evidence of RNA looping by PTB using Fluorescence Resonance Energy Transfer and NMR Spectroscopy.

    Biophysical Society, **2009.**

14. Protein-RNA dynamics in the central junction control 30S ribosome assembly.

    Gordon Research Conferences-Single Molecule Approaches to Biology, **2008.**

15. Protein-RNA dynamics in the central junction control 30S ribosome assembly.

    Emerging Nanoscience Applications in Technology and Biomedicine (ENATBIO) Conference, **2007.**

16. Single molecule FRET to explore protein-RNA integrations in the central domain of the 30S ribosomal subunit.

    RNA Society, **2007.**

17. Probing the interaction between PTB and RNA by Fluorescence Resonance Energy Transfer.

    RNA Society, **2006.**

TEACHING (UTK)

BCMB606: Journal Club: Structural Biology and Biochemistry

BCMB511: Advanced Protein Chemistry and Cell Biology

REVIEWER FOR PEER-REVIEWED JOURNALS

Royal Society of Chemistry (RSC Advances, RSC Analyst)
Biomolecules
International Journal of Molecular Sciences (IJMS)
MDPI (Molecules)
Chemistry - A European Journal

PROFESSIONAL AFFILIATIONS

Biophysical Society (2009 – present)

American Chemical Society (2007 – 2012)

RNA Society (2006 – present)

Nepal Chemical Society (2002 – present)