

Rahul S. Kathayat

Department of Chemistry, University of Chicago
E347G GCIS, 929E 57th St., Chicago, IL-60637
773-941-2017
rskathayat@uchicago.edu, rskphychemist2007@gmail.com

Research Interest

My research interest lies in exploring real-time molecular level insights about various intracellular biological systems by chemical approaches. This research relies on application of synthetic organic chemistry to follow challenging questions in biology, that are, otherwise, difficult to be answered by known genetic approaches. Ease of tunability and targetability of small molecules, coupled with non-invasive and high sensitivity of fluorescence endow fluorescence-based molecular probes great potential to study biological processes in live cells. In current research, we developed fluorescent probes to measure S-depalmitoylation activity in cytosol (*by DPPs*) and mitochondria (*by mitoDPPs*). The motivation behind my research is that being a chemist we have the power to provide technological solutions by *creative* and *rational* designing to unravel the complex truths about cells, and hence ourselves.

Professional Experience and Education

Postdoctoral Research, University of Chicago <i>with Assistant Professor Dr. Bryan C. Dickinson, Department of Chemistry</i>	2014 - present
Doctoral Research, University of Zürich <i>with Professor Dr. Nathaniel S. Finney, Department of Organic Chemistry</i>	2009 - 2014
Master's, Indian Institute of Technology (IIT) Bombay <i>with Professor Dr. Anil Kumar, Department of Chemistry</i>	2007 - 2009
Bachelor's, University of Delhi, Hindu College	2004 - 2007

Awards

2017	ACS Division of Biological Chemistry Travel Fellowship for Best Poster , Gordon Research Conference, Bioorganic Chemistry, Proctor Academy, Andover, NH, USA
2016	Kharasch Travel Award , Department of Chemistry, University of Chicago
2007	MCM Scholarship , Indian Institute of Technology (IIT) Bombay, India

Achievements

2009	All India Rank 11 , Graduate Aptitude Test in Engineering (GATE) in Chemistry
2009	CSIR-NET Qualified , Test for lectureship, India
2007	All India Rank 52 , Indian Institute of Tech. Joint Admission Test M.Sc. (IIT-JAM)

Peer-Reviewed Publications

Postdoctoral Research (* denotes equal contribution)

- Kathayat, R.S.**, Dickinson, B.C., "Measuring S-depalmitoylation activity *in vitro* and in live cells with fluorescent probes." *In press, Meth. Mol. Biol.* (2018).
- Sadeghi, R.S., Kulej, K., **Kathayat, R.S.**, Garcia, B.A., Dickinson, B.C., Brady, D.C., Witze, E.S., "Wnt5a signaling induced phosphorylation increases APT1 activity and promotes melanoma metastatic behavior." *eLife*. 7, e34362 (2018). [link](#)
- Kathayat, R.S.**, Cao, Y., Elvira, P.D., Sandoz, P.A., Zaballa, M-E., Springer, M.Z., Drake, L.E., Macleod, K.F., van der Goot, F.G., Dickinson, B.C., "Active and dynamic mitochondrial

S-depalmitoylation revealed by targeted fluorescent Probes." *Nat. Commun.* 9, 334 (2018). [link](#)

Highlighted in:

- "Palmitoylation Signaling: A novel mechanism of mitochondrial dynamics and diverse pathologies." *Acta Biochim Biophys Sin.* 1 (2018). [link](#)
5. Qiu, T.*, **Kathayat, R.S.***, Cao, Y.*, Beck, M.W., Dickinson, B.C., "A fluorescent probe with improved solubility permits the analysis of protein S-depalmitoylation activity in live cells." *Biochemistry.* 57, 221-225 (2018). [link](#)
 4. Beck, M.W., **Kathayat, R.S.**, Cham, C.M., Chang, E.B., Dickinson, B.C., "Michael addition-based probes for ratiometric fluorescence imaging of protein S-depalmitoylases in live cells and tissues." *Chem. Sci.* 8, 7588-7592 (2017). [link](#)
 3. **Kathayat, R.S.**, Elvira, P.D., Dickinson, B.C., "A fluorescent probe for cysteine depalmitoylation reveals dynamic APT signaling." *Nat. Chem. Biol.* 13, 150-154 (2017). [link](#)

Doctoral Research

2. **Kathayat, R.S.**, Yang, L., Sattasathuchana, T., Zoppi, L., Baldrige, K.K., Linden, A., Finney, N.S. "On the origins of non-radiative excited state relaxation in aryl sulfoxides relevant to fluorescent chemosensing." *J. Am. Chem. Soc.* 138, 15889-15895 (2016). [link](#)
1. **Kathayat, R.S.**, Finney, N.S. "Sulfoxides as response elements for fluorescent chemosensors." *J. Am. Chem. Soc.* 135, 12612-12614 (2013). [link](#)

Patents

1. Dickinson, B.C., **Kathayat, R.S.**, Beck, M.W., "Synthetic substrates for enzymes that catalyze reactions of modified cysteines and related methods." *US 20180147250* (2018). [link](#)

Selected Presentations

<u>OP – Oral presentation</u>	<u>PP – Poster presentation</u>
2017	Bioorganic Chemistry – Gordon Research Conference , Proctor Academy, Andover, NH, USA (<i>PP</i>)
2016	ChemBio Meeting , University of Chicago, USA (<i>OP, Invited</i>)
2013	Physical Organic Chemistry – Gordon Research Conference , Holderness School, Holderness, NH, USA (<i>PP</i>)
2013	Physical Organic Chemistry – Gordon Research Seminar , Holderness School, Holderness, NH, USA (<i>PP</i>)
2013	CMSZH Retreat , Switzerland (<i>OP, Invited</i>)
2013	8th Dorothy Crowfoot Hodgkin Symposium , University of Zürich, Switzerland (<i>PP</i>)
2012	4th EuCheMS Chemistry Congress , Prague, Czech Republic (<i>PP</i>)
2011	Swiss Chemical Society , EPFL, Switzerland (<i>OP</i>)
2010	Swiss Chemical Society , ETH, Switzerland (<i>PP</i>)

Teaching Experiences

- Supervised four undergrad students in synthetic organic chemistry in University of Chicago
- Trained an undergrad student in synthetic organic chemistry in University of Zürich, Switzerland
- Two years of teaching assistance for organic labs in the University of Zürich, Switzerland

Other Activities

- Assisted in writing R01-NIDDK and UCCCC program pilot project grants at University of Chicago
- Participated in peer-reviewing of articles
- Assisted undergrad trainees in securing various departmental funding for summer internship under my supervision at University of Chicago
- Lab outreach program "*Building with Biology*" with George Leland STEM School (2017)

