

Stefan Badelt

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Educational Background

- 2011 – 2016 Graduate studies in Molecular Biology, University of Vienna
PhD thesis with Prof. Ivo Hofacker:
Control of RNA function by conformational design
Graduation with distinction, PhD
- 2004 – 2011 Undergraduate studies in Molecular Biology, University of Vienna
Master's thesis with Prof. Ivo Hofacker:
RNA folding kinetics including pseudoknots
Graduation with distinction, Mag. rer. nat.

Professional Experience

- 2016/04 – *present* **Postdoctoral Scholar** – Compilers for DNA strand displacement systems with Erik Winfree – Division of Biology and Biological Engineering
California Institute of Technology, Pasadena, USA
- 2011/10 – 2016/03 **Ph.D. thesis** – Control of RNA function by conformational design with Ivo L. Hofacker – Theoretical Biochemistry
Institute for Theoretical Chemistry, Vienna, Austria
- WS2013 – SS2015 **Teaching** – Exercises for Foundations of Bioinformatics
University of Vienna, Austria
- 2009/05 – 2011/09 **Master's thesis** – RNA folding kinetics including pseudoknots with Ivo L. Hofacker – Theoretical Biochemistry
Institute for Theoretical Chemistry, Vienna, Austria
- 2008/07 – 2008/09 **Internship** – Chromosome degradation in apoptotic cells with Reinhard Ullmann – Molecular Cytogenetics
Max Planck Institute for Molecular Genetics, Berlin, Germany
- 2008/03 – 2008/04 **Internship** – Interaction of Stat1-GRDBD-Stat1 and GRE with Pavel Kovarik – Infection Biology
Max F. Perutz Laboratories, Vienna, Austria
- 2006/07 – 2009/03 **Technician** – Plasmid library administration, genotyping
Max F. Perutz Laboratories, Vienna, Austria
Group Kovarik – Infection Biology

Funding Awards

- 2016/05 Caltech Biology and Biological Engineering Division Fellowship
2011/05 Max F. Perutz Laboratories PhD program selection - Track RNA biology

Skills

- Languages: German (native), fluent English
- Computer Skills: Python, Perl, Bash, LaTeX, R, C, C++, ...
- Lab-Techniques: PCR, Real Time PCR, Tissue Culture work (including Nucleofection), Immunfluorescence, Immunoprecipitation, Nuclear Extract, Western Blot Analysis, Electrophoretic Mobility Shift Assay, DNA/RNA Extraction, DNA/RNA Gel Electrophoresis, Reverse Transcription, Array CGH, Oligoarray, BAC Array, ChIP on Chip.
- Snowboard and Windsurfing instructor

Publications

- [1] S. Badelt, S. W. Shin, R. F. Johnson, Q. Dong, C. Thachuk, and E. Winfree, "A general-purpose CRN-to-DSD compiler with formal verification, optimization, and simulation capabilities," in *International Conference on DNA-Based Computers*, pp. 232–248, Springer, 2017.
- [2] S. Badelt, *Control of RNA function by conformational design*. PhD thesis, University of Vienna, 2017.
- [3] M. Tajaddod, A. Tanzer, K. Licht, M. T. Wolfinger, S. Badelt, F. Huber, O. Pusch, S. Schopoff, M. Janisiw, I. Hofacker, and M. F. Jantsch, "Transcriptome-wide effects of inverted SINEs on gene expression and their impact on RNA Polymerase II activity," *Genome Biology*, vol. 17, no. 1, p. 220, 2016.
- [4] S. Badelt, C. Flamm, and I. L. Hofacker, "Computational design of a circular RNA with prionlike behavior," *Artificial Life*, vol. 22, pp. 1–13, 2016.
- [5] S. Petkovic, S. Badelt, S. Block, C. Flamm, M. Delcea, I. L. Hofacker, and S. Müller, "Sequence-controlled RNA self-processing: computational design, biochemical analysis and visualization by AFM," *RNA*, vol. 21, pp. 1249–1260, 2015.
- [6] S. Badelt, S. Hammer, C. Flamm, and I. L. Hofacker, "Thermodynamic and kinetic folding of riboswitches," in *Methods in Enzymology*, vol. 553, pp. 193–213, Elsevier, 2015.
- [7] S. Badelt, C. Flamm, and I. L. Hofacker, "Computational design of a circular RNA with prion-like behaviour," in *ALIFE 14: The Fourteenth Conference on the Synthesis and Simulation of Living Systems*, vol. 14, pp. 565–568, 2014.
- [8] G. Ebert, A. Steininger, R. Weißmann, V. Boldt, A. Lind-Thomsen, J. Grune, S. Badelt, M. Heßler, M. Peiser, M. Hitzler, L. R. Jensen, I. Müller, H. Hu, P. F. Arndt, A. W. Kuss, K. Tebel, and R. Ullmann, "Distribution of segmental duplications in the context of higher order chromatin organisation of human chromosome 7," *BMC genomics*, vol. 15, no. 1, p. 537, 2014.

- [9] M. Marz, A. R. Gruber, C. Höner zu Siederdisen, F. Amman, S. Badelt, S. Bartschat, S. H. Bernhart, W. Beyer, S. Kehr, R. Lorenz, A. Tanzer, D. Yusuf, H. Tafer, I. L. Hofacker, and P. F. Stadler, "Animal snoRNAs and scaRNAs with exceptional structures," *RNA biology*, vol. 8, no. 6, pp. 938–946, 2011.

Selected Conferences, Talks & Posters

- *DNA23 Conference* in Austin, Texas, Sept 24 - 28, 2017
Talk: A General-Purpose CRN-to-DSD Compiler with Formal Verification, Optimization, and Simulation Capabilities
- *DNA22 Conference* in Munich, Germany, Sept 4 - 8, 2016
Talk: Energy landscapes and folding kinetics of pairwise interacting RNAs
Poster: Nuskell: A verifying and optimizing CRN-to-DSD compiler
- *DNA21 Conference* in Boston, USA, Aug 17 - 21, 2015
- *Gordon Research Conference on RNA nanotechnology* in Ventura, USA, Feb 1 - 6, 2015
Poster: Design of XOR riboswitches
- *Artificial Life Conference* in New York, USA, Jul 30 - Aug 2, 2014
Talk: Design of a circular RNA with prion-like behavior
- *International Synthetic and Systems Biology Summer School* in Taormina, Italy, Jun 15 - 19, 2014
Poster: Sequence-controlled RNA self-processing: computational design, biochemical analysis and visualization by AFM
- *TBI Winterseminar* in Bled, Slovenia, Feb 16 - 23, 2014
Talk: Folding kinetics of self-polymerizing RNA
- *Herbstseminar Bioinformatik* in Decin, Czech Republic, Oct 2 - 7, 2013
Talk: Circularization and multimerization of synthetic ribozymes
- *TBI Winterseminar* in Bled, Slovenia, Feb 13 - 20, 2011
Talk: Energy barriers in pseudoknot conformation space
- *Herbstseminar Bioinformatik* in Vysoká Lípa, Czech Republic, Oct 5 - 10, 2010
Talk: Design & future aspects of artificial RNA-switches in synthetic biology