

Curriculum Vitae

Philip C. Bevilacqua

Personal

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Education

1993 University of Rochester, Ph.D., Physical Chemistry
1989 University of Rochester, M.S., Chemistry
1987 John Carroll University, B.S., *summa cum laude*, Chemistry Major, Physics Minor

Professional Experience

2018-6.30.2024 Head, Department of Chemistry, Penn State
2018-present Distinguished Professor of Chemistry and of Biochemistry & Molecular Biology
2015 - 2017 Professor of Biochemistry and Molecular Biology, Pennsylvania State University
2015 - present Member Bioinformatics and Genomics Graduate Program, Pennsylvania State University
2008 - present Member Molecular Cellular and Integrative Biosciences (MCIBS) Graduate Program, Pennsylvania State University
2006 - present Member Plant Biology Graduate Program, Pennsylvania State University
1997 - 2017 Assistant, Associate, and Full Professor of Chemistry, Penn State
1993 - 1997 Postdoctoral Research, University of Colorado, Boulder/HHMI
Advisor: Professor Thomas R. Cech. Topic: Molecular Recognition of RNA by the dsRNA-Binding Domain from the RNA-Activated Protein Kinase PKR
1987 - 1993 Graduate Research, University of Rochester
Advisor: Professor Douglas H. Turner. Topic: Dynamics of Substrate-Ribozyme Interaction
1986 NSF Summer Research Fellow, Oak Ridge National Labs/Univ. of Tennessee, Knoxville

Honors and Awards

Research

2024 Keynote Speaker, RNA RRM 2024 Meeting
2022 Keynote Speaker, Northwestern University T32 Training Grant Symposium
2020 Keynote Speaker, Bermuda Principles
2019 Swiss RNA Biology Programme Speaker at ETH Zurich and University of Bern
2019 Keynote Speaker, International Symposium RNA Tool and Target. Duke University, Durham, NC
2018 Gomberg Lecturer, U Michigan, Ann Arbor MI
2018 Keynote Speaker, CMBP/RNA Biology Symposium, Ohio State University
2018 Distinguished Professor, Penn State
2016 Keynote Speaker, Zing Nucleic Acids Conference, Tampa, FL
2013 Keynote Speaker, RNA Upstate NY: Finger Lakes RNA Conference
2010 Faculty Scholar Medal in Physical Sciences, Penn State
2009 Elected Fellow of American Association for Advancement of Science (AAAS)
2001 - 2006 Camille Dreyfus Teacher-Scholar
2001 - 2006 Alfred P. Sloan Foundation Fellow
2000 - 2005 National Science Foundation (NSF), Faculty Career Development (CAREER) Award
1993 - 1996 Jane Coffin Childs Medical Research Postdoctoral Fellow, University of Colorado
1987 - 1989 Robert L. and Mary L. Sproull University Fellow, University of Rochester
1986 ACS Award in Analytical Chemistry, John Carroll University

Teaching

2020 Alumni/Student Award for Excellence in Teaching, Penn State University-wide
2018 Priestley Teaching Prize, Penn State Chemistry
2015 CESE Tombros Education Fellow, Penn State
2012 C.I. Noll Award for Excellence in Teaching, Penn State Eberly College
2010 - 2012 Distinguished Honors Faculty Fellow, Penn State Schreyer Honors College

Professional Memberships

AAAS, 1989-present
Alpha Sigma Nu, 1986-present
American Chemical Society; Member of Biological Division, 1996-present
Kavli Fellow, National Academy of Sciences, 2008-present
PSU Center for RNA Molecular Biology; Huck Institutes; 2009-present *Co-director*
PSU Center for Structural Biology; 2023-present
RNA Society, 1997-present; Member of Editorial Board, 2004-present

Professional Activities

Editorial Positions

2022 Co-edited *Journal of Molecular Biology* special issue on “Regulatory Mechanisms through RNA Conformational Switching and Dynamics” with Professor Blanton Tolbert (CWRU) with 16 peer-reviewed articles, including one from my group.
2014-present Editorial Board for *Journal of Molecular Biology*
2004-present Editorial Board for *RNA*
2007,2012,2017 Guest Editor *Proceedings of the National Academy of Sciences*
2008 Guest Editor *Current Opinions in Chemical Biology*
2004 Guest Editor *Biopolymers: Nucleic Acids Issue*

Review Panels

2023 NASA Exobiology Review Panel, Prebiotic Chemistry
2019 NIH F04B Fellowship Panel
2018 NIH Special Emphasis Panel // NIH F04B Fellowship Panel
2017 NIH K99/R00 Panel, CHESS Proposal Reviewer (8-10 proposals)
2013, 2016 NSF Review Panel
2015 NIH MSFA Study Section (Feb 2015 and June 2015)
2006-present Committee co-chair RNA Society Scaringe Award Selection
2014 NSF Advisory Panel // *J. Mol. Biol.* Editors Meeting. San Francisco
2011, 2012 NIH PPG Study Sections
2010 NIH MGA Study Section
2007-present Reviewer for the Royal Society of Chemistry (RSC), Invited Member
2005 NIH P01 Site Visit for RNA Folding PPG, Stanford University
2003-2011 NSF Review Panel

Meeting Organization

2025 Penn State Center for RNA Molecular Biology, 2nd Annual RNA Symposium (Univ Pk, PA)
2024 Penn State Center for RNA Molecular Biology, 1st Annual RNA Symposium (Univ Pk, PA)
2022 Moderator, NIH Meeting “Capturing RNA Sequence and Transcript Diversity, From Technology Innovation to Clinical Application” (Online)
2022 Co-Organizer, 23rd Penn State Plant Biology Symposium “RNA Control of Gene Expression in Plants and Beyond” (Penn State)
2022 Presider BIOL Division ACS: Mid-Career Investigators Symposium (Chicago, IL).
2019 Program Chair BIOL Division ACS. Spring Meeting (Orlando, FL); Fall Meeting (San Diego, CA)
2018 Co-Chair, Telluride Nucleic Acids Chemistry Workshop
2018 Organizer, American Chemical Society, RNA Structure Function Session (New Orleans, LA)
2017-18 Elected to RNA Rustbelt Meeting Steering Committee
2015 Workshop Chair, 20th Annual RNA Society Conference (Madison, WI)
2014 Session Chair at RiboClub Meeting (Sherbrooke Québec CANADA)
2014 Co-Chair, RNA Rustbelt Meeting (Pittsburgh, PA)
2013 Vice-Chair, RNA Rustbelt Meeting (Cleveland, OH)
2013 Co-Chair, Nucleic Acids Dynamics Workshop (Telluride, CO)
2013 Organizer, ACS PHYS Symposium, 245th ACS National Meeting (New Orleans, LA)
2011 Organizer, Automated Biological Calorimetry Workshop. (Penn State)
2010 Co-Chair, 2010 FASEB Nucleic Acids Enzymes Meeting (Saxtons River, VT)
2007 Session Chair, 233rd ACS National Meeting (Chicago, IL)
2006 Co-Chair, Plant Physiology Meeting, “RNA Biology: Novel Insights from Plant Systems” (Penn State)
2005 Session Coordinator/Chair at National Meeting: RNA 2005 (Banff, **Canada**)

2004 Session Coordinator/Chair at National Meeting: RNA 2004 (Madison, WI)
 2000 Co-Chair 19th Summer Symposium in Molecular Biology “*The Protein and RNA Folding Problems: Sharing Perspectives*” (Penn State)

Notable Penn State Committees (recent)

2024 Search Committee Assistant Dean for Graduate and Postdoctoral Affairs
 2023 Search Committee Associate Dean Research and Innovation; *Chair*
 2022 Search Committee Department Head of Physics; *Chair*
 2021 Academy for Equity Minded, Anti-Racist Leadership at Penn State
 2018-present Department Head
 2017-2018 Department Promotion & Tenure Committee; *Chair*.
 2016-2017 Biochemistry and Molecular Biology Department Search for New Head Committee; *Chair*
 2015-2016 World Campus Instructor Search; *Chair*
 2012-2015 Department Promotion & Tenure Committee; *Chair 2013-2015*
 2010-2012 Eberly College Promotion & Tenure Committee; *Chair 2011-2012*
 2010-present Established NSFMRI-funded Automated Biological Calorimetry Facility; Huck Institutes; Currently *Chair* of Facilities Advisory Committee
 2009-present Center for RNA Molecular Biology; Huck Institutes; *Co-director*
 2008-2018 University Isotopes Committee (UIC); *Vice Chair*

Notable Outreach Efforts

2023 Our research cited in Nobel Prize in Medicine 2023. Written up many places including Penn State, RNA Society, and John Carroll University.
 2023 News interview by News Medical, “Exploring the World of RNA Chemistry.”
 2022 Podcast for Telluride Science “Science Straight up: Serendipity in Science and why Basic Science Matters”. Available on Apple Podcasts
 2021 Hands-on RNA Science with the Punk Science Program in the Pinhead Institute (Telluride CO).
 2019 Program Chair (Elected), Division of Biological Chemistry
 2016 ASBMB (IMAGE) Grant Writing Workshop for New Faculty (Georgetown, Washington DC)
 2013-2016 Millennium Science Summer Workshops in Chemistry
 2011-2014 Hosted summer SEECoS students in our lab
 2013 Participated in Penn State Science Recruiting Video with WPSU
 2012 Presented in Discovery-U for PSU Undergraduates. Video is online.
 1998-2002; 2005-2011 Career site for “Take Our Daughters and Sons to Work Day”

Research Honors for Students and Postdocs

2024 RNA Society Early-Career Award, Chun Kit Kwok
 2024 Second Year Graduate Student Award, Francesco Pecere
 2024 Pennsylvania Space Grant, Francesco Pecere
 2024 Gordon Research Conference Travel Award, Anwesha Ghosh
 2024 RNA Society Research Presentation Fellowship for RNA 2024 in Edinburgh Scotland, Kobie Kirven and Lauren McKinley
 2024 PSU Graduate Student Travel Award, Lauren McKinley
 2024 Harry and Catharine Dalalian Graduate Fellowship, Lauren McKinley
 2024 PSU Graduate Student International Travel Award, Lauren McKinley
 2024 RNA Society Penn State RNA Salon Travel Award, Andrew Veenis
 2024 NY RNA Symposium NSF Travel Award, Andrew Veenis
 2024 NY RNA Symposium Outstanding Research Talk, Andrew Veenis
 2023 Robert T. Simpson Graduate Student Award for Innovative Research, McCauley Meyer
 2023 ACS Gordon Hammes Scholar Award, Jacob Sieg
 2023 Outstanding Science Alumni Award, Trevor Brown
 2022 Paul Berg Prize, Lauren McKinley
 2021 McCarl Scholarship, Allison Williams
 2021 Goldwater Scholarship, Peter Forstmeier
 2020/1 Beckman Scholarship, Samantha Grecco
 2020 NASA PA Space Grant Graduate Fellow, Andrew Veenis
 2019 NASA PA Space Grant Graduate Fellow, McCauley Meyer
 2019 Best Talk (2nd place), Rustbelt RNA Meeting, Allison Williams
 2019 Best Poster Award, Life Science Symposium, Allison Williams

2019	USDA-NIFA Fellowship, Megan Sylvia
2019	Gordon Hammes Scholar Award, Kathleen Leamy
2018	NIH T32 Eukaryotic Training Grant, Catherine Douds
2018	NSF Graduate Research Fellowship, Honorable Mention, Jacob Sieg
2017	Best Poster Award, 4 th Annual RNA Symposium, Kate Leamy
2017	RNA Society/Scaringe Award Best Graduate Student, Madeline Sherlock
2015	NSF Graduate Research Fellowship, Honorable Mention, Laura Ritchey
2014	Dalton Undergraduate Student Research Fund for Women in Sciences, Ananya Anmangandla
2014	NSF Graduate Research Fellowship, Honorable Mention, Jamie Bingaman
2013	Penn State Alumni Association Dissertation Award, Chun Kit Kwok
2012	Best Student Talk, Rustbelt RNA Meeting 2012, Jennifer Wilcox
2011	NSF Graduate Research Fellowship, Honorable Mention, Christopher Strulson
2010	Best Poster Award, ASBMB Meeting (Anaheim, CA), Rebecca Toroney
2009	Best Poster Awards, Symposium on RNA Biology VIII (Research Triangle Park, UNC), Melissa Mullen, Joshua Sokoloski
2007	NSF Graduate Research Fellowship, Honorable Mention, Melissa Mullen
2007	Best Poster, Rustbelt RNA Meeting 2007, Laurie Heinicke
2007	Jean Dreyfus Boissevain Undergraduate Scholarship for Excellence in Chemistry, Liz Gratton
2006-2008	NIH NSRA Fellowship, Joshua Sokoloski
2004-2007	NSF Graduate Research Fellowship, Andrea Cerrone-Szakal
2004	Best Poster, RNA Structure Function Meeting (Edinburgh, Scotland), Rieko Yajima
2003	Penn State Alumni Association Dissertation Award, David Proctor
2003	Best Poster, Nucleic Acids Gordon Conference, Ellen Moody
2002-2005	Sloan Scholarship, Trevor Brown
2002-2005	NSERC Predoctoral Fellowship, Rieko Yajima
2002	Paul Berg Prize in Molecular Biology, Ellen Moody
2001-2005	NIH Predoctoral Fellowship, Trevor Brown
1997-present	Numerous Penn State Travel and Graduate Fellowship Awards to Students and Postdocs

Publications: (*Corresponding author) H-Index (Web of Science): 55 (Google Scholar): 66

1. Sugimoto, N., Tomka, M., Kierzek, R., Bevilacqua, P. C. and Turner, D. H.* "Effects of Substrate Structure on the Kinetics of Circle Opening Reactions of the Self-Splicing Intervening Sequence from *Tetrahymena thermophila*: Evidence for Substrate and Mg²⁺ Binding Interactions." *Nucleic Acids Res.* **17**, 355-371 (1989).
2. Bevilacqua, P. C. and Turner, D. H.* "Comparison of Binding of Mixed Ribose-Deoxyribose Analogues of CUCU to a Ribozyme and to GGAGAA by Equilibrium Dialysis: Evidence for Ribozyme Specific Interactions with 2' OH Groups." *Biochemistry* **30**, 10632-10640 (1991).
3. Bevilacqua, P. C., Kierzek, R., Johnson, K. A. and Turner, D. H.* "Dynamics of Ribozyme Binding of Substrate Revealed by Fluorescence Detected Stopped-Flow." *Science* **258**, 1355-1358 (1992).
4. Kierzek, R., Li, Y., Turner, D. H.* and Bevilacqua, P. C. "5'-Amino Pyrene Provides a Sensitive, Non-Perturbing Fluorescent Probe of RNA Secondary and Tertiary Structure Formation." *J. Am. Chem. Soc.* **115**, 4985-4992 (1993).
5. Bevilacqua, P. C., Johnson, K. A. and Turner, D. H.* "Cooperative and Anticooperative Binding to a Ribozyme." *Proc. Natl. Acad. Sci. USA* **90**, 8357-8361 (1993).
6. Turner, D. H.* and Bevilacqua, P. C. "Thermodynamic Considerations for Evolution by RNA." Invited Chapter in *RNA World*, Cold Spring Harbor Press, eds Ray Gesteland and John Atkins, 447-464 (1993).
7. Bevilacqua, P. C., Li, Y. and Turner, D. H.* "Fluorescence-Detected Stopped Flow with a Pyrene Labeled Substrate Reveals That Guanosine Facilitates Docking of the 5' Cleavage Site into a High Free Energy Binding Mode in the *Tetrahymena* Ribozyme." *Biochemistry* **33**, 11340-11348 (1994).
8. Li, Y., Bevilacqua, P. C., Mathews, D. and Turner, D. H.* "Thermodynamic and Activation Parameters for Binding of a Pyrene Labelled Substrate by the *Tetrahymena* Ribozyme: Docking is Not Diffusion Controlled and is Driven by a Favorable Entropy Change." *Biochemistry* **34**, 14394-14399 (1995).
9. Bevilacqua, P. C., Sugimoto, N. and Turner, D. H.* "A Mechanistic Framework for the Second Step of Splicing Catalyzed by the *Tetrahymena* Ribozyme." *Biochemistry* **35**, 648-658 (1996).

10. Turner, D. H.* , Li, Y., Fountain, M., Profenno, L. and Bevilacqua, P. C. "Dynamics of a Group I Ribozyme Detected by Spectroscopic Methods." In *Nucleic Acids & Molecular Biology*, eds Fritz Eckstein & David M. J. Lilley, 10, 19-32 (1996).
11. Cech, T. R.* , Bevilacqua, P. C., Doudna, J. A., McConnell, T. S., Strobel, S. A., Weinstein, L. B. "Mechanism and Structure of a Catalytic RNA Molecule." In *Proceedings of the Robert A. Welch Foundation*, 91-110 (1993).
12. Bevilacqua, P. C. and Cech, T. R.* "Minor-Groove Recognition of Double-Stranded RNA by the Double-Stranded RNA-Binding Domain from the RNA-Activated Protein Kinase PKR." *Biochemistry* 35, 9983-9994 (1996).
13. Bevilacqua, P. C.* , George, C., Samuel, C. E., and Cech, T. R. "Binding of the Protein Kinase PKR to RNAs with Secondary Structure Defects: Role of the Tandem A-G Mismatch and Noncontiguous Helices." *Biochemistry* 37, 6303-6316 (1998).
14. Szewczak, A. A., Podell, E., Bevilacqua, P. C., and Cech, T. R.* "Thermodynamic Stability of the P4-P6 Domain RNA Tertiary Structure Measure by Temperature Gradient Gel Electrophoresis." *Biochemistry* 37, 11162-11170 (1998).
15. Bevilacqua, J. M. and Bevilacqua, P. C.* "Thermodynamic Analysis of an RNA Combinatorial Library Contained in a Short Hairpin." *Biochemistry*, 37, 15877-15884 (1998).
16. Arnold, J. J., Ghosh, S.K.B., Bevilacqua, P. C. and Cameron, C.* "Single-Nucleotide Resolution of RNA Strands in the Presence of their RNA Complements." *Biotechniques*, 27, 450-456 (1999).
17. Shu, Z., and Bevilacqua, P. C.* "Isolation and Characterization of Thermodynamically Stable and Unstable RNA Hairpins from a Triloop Combinatorial Library." *Biochemistry*, 38, 15369-15379 (1999).
18. Bevilacqua, P. C.* "Exploring the Possibility of an RNA World." Book Review of "The RNA World," 2nd Ed., Gesteland, R. F., Cech, T. R., and Atkins, J. F. Eds. for *Nature Struct. Biol.*, 6, 997 (1999).
19. Nakano, S., Chadalavada, D. M., and Bevilacqua, P. C.* "General Acid-Base Catalysis in the Mechanism of an HDV Ribozyme." *Science*, 287, 1493-1497 (2000).
20. Chadalavada, D. M., Knudsen, S. K., Nakano, S., and Bevilacqua, P. C.* "A Role for Upstream RNA Structure in Facilitating the Catalytic Fold of the Genomic Hepatitis Delta Virus Ribozyme." *J. Mol. Biol.* 301, 349-368 (2000).
21. Zheng, X., and Bevilacqua, P. C.* "Straightening of Bulged RNA by the Double-Stranded Domain from the Protein Kinase PKR." *Proc. Natl. Acad. Sci. USA* (Track II) 97, 14162-14167 (2000).
22. Zheng, X. and Bevilacqua, P. C.* "Efficient Construction of Long DNA Duplexes with Internal non-Watson-Crick Motifs and Modifications." *Nucleic Acids Res.* 29, E6 (2001).
23. Bevilacqua, P. C.* "Making Biochemistry Required Reading." *Chemical & Engineering News*. 79, 219 (2001).
24. Nakano, S., Proctor, D. J., and Bevilacqua, P. C.* "Mechanistic Characterization of the HDV Genomic Ribozyme: Assessing the Catalytic and Structural Contributions of Divalent Metal Ions within a Multi-Channel Reaction Mechanism." *Biochemistry*, 40, 12022-12038 (2001).
25. Nakano, S. and Bevilacqua, P. C.* "Proton Inventory of the Genomic HDV Ribozyme in Mg²⁺-Containing Solutions." *J. Am. Chem. Soc.*, 123, 11333-11334 (2001).
26. Chadalavada, D. M., Senchak, S. E., and Bevilacqua, P. C.* "The Folding Pathway of the Genomic Hepatitis Delta Virus Ribozyme is Dominated by Slow Folding of the Pseudoknots." *J. Mol. Biol.*, 317, 559-575 (2002).
27. Bevilacqua, P.C. and Turner, D.H.* "Use of fluorescence spectroscopy to elucidate RNA folding pathways." In *Current Protocols in Nucleic Acid Chemistry* (S. Beaucage et al., eds.). John Wiley & Sons, New York. 11.8.1-11.8.6 (2002).
28. Bevilacqua, P. C. "Battle for the Bulge: Directing Natural Products to DNA Defects." *Chem. Biol.*, 9, 854-855 (2002).
29. Proctor, D. J., Schaak, J. E., Bevilacqua, J. M., Falzone, C. J. and Bevilacqua, P. C.* "Isolation and Characterization of a Family of Stable Tetraloops with the Motif YNMG that Participate in Tertiary Interactions." *Biochemistry*, 41, 12062-12075 (2002).

30. Diegelman-Parente, A., and Bevilacqua, P. C.* "A Mechanistic Framework for Co-transcriptional folding of the HDV Genomic Ribozyme in the Presence of Downstream Sequence." *J. Mol. Biol.*, 324, 1-16 (2002).
31. Nakano, M., Moody, E. M., Liang, J., and Bevilacqua, P. C.* "Selection for Thermodynamically Stable DNA Tetraloops Using Temperature Gradient Gel Electrophoresis Reveals Four Motifs: d(cGNNAg), d(cGNABg), d(cCNGGg), and d(gCNGGc)." *Biochemistry*, 41, 14281-14292 (2002).
32. Moody, E. M., and Bevilacqua, P. C.* "Thermodynamic Coupling of the Loop and Stem in Unusually Stable DNA Hairpins Closed by CG Base Pairs." *J. Am. Chem. Soc.*, 125, 2032-2033 (2003).
33. Proctor, D. J., Kierzek, E., Kierzek, R., and Bevilacqua, P. C.* "Restricting the Conformational Heterogeneity of RNA by Specific Incorporation of 8-Bromoguanosine." *J. Am. Chem. Soc.*, 125, 2390-2391 (2003).
34. Bevilacqua, P. C.* "Mechanistic Considerations for General Acid-Base Catalysis by RNA: Revisiting the Mechanism of the Hairpin Ribozyme." *Biochemistry*, 42, 2259-2265 (2003).
35. Nakano, S., Cerrone, A. L., and Bevilacqua, P. C.* "Mechanistic Characterization of the HDV Genomic Ribozyme: Classifying the Catalytic and Structural Metal Ion Sites within a Multichannel Reaction Mechanism." *Biochemistry*, 42, 2982-2994 (2003).
36. Bevilacqua, P. C.*, Brown, T. S., Chadalavada, D. M., Parente, A. D. and Yajima, R. "Kinetic Analysis of Ribozyme Cleavage." In *Kinetic Analysis of Macromolecules: A Practical Approach* (K. Johnson, ed.) Oxford University Press. Chpt 3, 49-74 (2003)
37. Babitzke, P.*, Schaak, J., Yakhnin, A. V., and Bevilacqua, P. C. "Role of RNA Structure in Transcription Attenuation in *Bacillus subtilis*: the *trpEDCFBA* Operon as a Model System." *Methods Enzymol.*, 371, 392-404 (2003).
38. Schaak, J. E., Yakhnin, H., Bevilacqua, P. C.*, and Babitzke, P.* "A Mg²⁺-Dependent RNA Tertiary Structure Forms in the *Bacillus subtilis* *trp* Operon Leader Transcript and Appears to Interfere with *trpE* translation control by inhibiting TRAP binding." *J. Mol. Biol.*, 332, 555-574 (2003).
39. Schaak, J. E., Babitzke, P.*, and Bevilacqua, P. C.* "Phylogenetic Conservation of RNA Secondary and Tertiary Structure in the *trpEDCFBA* Operon Leader Transcript in *Bacillus*." *RNA* 9, 1502-1515 (2003).
40. Moody, E. M., and Bevilacqua, P. C.* "Folding of a Stable DNA Motif Involves a Highly cooperative network of Interactions." *J. Am. Chem. Soc.*, 125, 16285-16293 (2003).
41. Bevilacqua, P. C.*, Brown, T. S., Nakano, S., and Yajima, R. "Catalytic Roles for Proton Transfer and Protonation in Ribozymes." *Biopolymers* 73, 90-109 (2004).
42. Bevilacqua, P. C.* "Mechanism of Catalytic RNA." *Biopolymers* 73, 69-70 (2004).
43. Moody, E. M., Feerrar, J. C., and Bevilacqua, P. C.* "Evidence that Folding of RNA Tetraloop Hairpin is Less Cooperative than its DNA Counterpart." *Biochemistry*, 43, 7992-7998 (2004).
44. Moody, E. M., and Bevilacqua, P. C.* "Structural and Energetic Consequences of Expanding a Highly Cooperative Stable DNA Hairpin Loop." *J. Am. Chem. Soc.* 126, 9570-9577 (2004).
45. Brown, T. S., Chadalavada, D. M., and Bevilacqua, P. C.* "Design of a Highly Reactive HDV Ribozyme Sequence Uncovers Facilitation of RNA Folding by Alternative Pairings and Physiological Ionic Strength." *J. Mol. Biol.* 341, 695-712 (2004).
46. Moody, E. M., Brown, T. S., and Bevilacqua, P. C.* "Simple Method for Determining Nucleobase pK_a Values by Indirect Labeling and Demonstration of a pK_a of Neutrality in dsDNA." *J. Am. Chem. Soc.* 126, 10200-10201 (2004).
47. Paxon, T. L., Brown, T. S. Hsiao-yu, N. L. Brancato, S. J., Roddy, E. S., Bevilacqua, P. C., and Ewing, A. G.* "Continuous Monitoring of Enzyme Reactions on a Microchip: Application to Catalytic RNA Self-Cleavage." *Anal. Chem.* 76, 6921-6927 (2004). (A 1 page overview of the article appears in the front of this issue.)
48. Proctor, D. J., Ma, H., Kierzek, E., Kierzek, R., Gruebele, M.*, and Bevilacqua, P. C.* "Folding Thermodynamics and Kinetics of YNMG RNA Hairpins: Specific Incorporation of 8-bromoguanosine Leads to Stabilization by Enhancement of the Folding Rate." *Biochemistry* 43, 14004-14014 (2004).
49. Tian, B., Bevilacqua, P. C., Diegelman-Parente, A., and Mathews, M. B.* "The Double-Stranded RNA Binding Motif: Interference and Much More." *Nat. Rev. Mol. Cell. Biol.* 5, 1013-1023 (2004).

50. Zheng, X., and Bevilacqua, P. C.* "Activation of the Protein Kinase PKR by Short Double-stranded RNAs with Single-stranded Tails." *RNA* 10, 1934-1945 (2004).
51. Moody, E. M., Lecomte, J. T. J., and Bevilacqua, P. C.* "Linkage Between Proton Binding and RNA Folding: A Thermodynamic Framework and Its Experimental Application for Investigating pK_a Shifting." *RNA* 11, 157-172 (2005).
52. Brown, T. S., and Bevilacqua, P. C.* "Method for assigning double-stranded RNA structures." *Biotechniques* 38, 368-372 (2005). (1 page overview of the article appears in the front of this issue.)
53. Bevilacqua, P. C.*, Brown, T. S., Chadalavada, D., Lecomte, J., Moody, E., and Nakano, S.-i. "Linkage Between Proton Binding and Folding in RNA: Implications for RNA Catalysis." *Biochem. Soc. Trans.* 33, 466-470 (2005).
54. Ma, H., Proctor, D. J., Kierzek, R., Kierzek, E., Bevilacqua, P. C.*, and Gruebele, M.* "Exploring the Energy Landscape of a Small RNA Hairpin by Temperature Tuning" *J. Am. Chem. Soc.* 128, 1523-1530 (2006).
55. Bevilacqua, P. C.*, and Yajima, R. "Nucleobase Catalysis in Ribozyme Mechanism" *Curr. Opin. Chem. Biol.* 10, 455-464 (2006).
56. Siegfried, N. A., Metzger, S. L., and Bevilacqua, P. C.* "Folding Cooperativity in RNA and DNA is Dependent on Position in the Helix." *Biochemistry* 46, 172-181 (2007).
57. Yajima, R., Proctor, D. J., Kierzek, R., Kierzek, E., and Bevilacqua, P. C.* "A Conformationally Restricted Guanosine Analogue Reveals the Catalytic Relevance of Three Structures of an RNA Enzyme" *Chem. & Biol.* 14, 23-30 (2007).
58. Nakano, S., and Bevilacqua, P. C.* "Mechanistic Characterization of the HDV Genomic Ribozyme: A Mutant of the C41⁺ Motif Provides Insight into Positioning and Thermodynamic Linkage of Metal Ions and Protons" *Biochemistry* 46, 3001-3012 (2007).
59. Blose, J. M., Silverman, S. K., and Bevilacqua, P. C.* "A Simple Model for Thermophilic Adaptation in Functional Nucleic Acids" *Biochemistry* 46, 4232-4240 (2007).
60. Bevilacqua, P. C.*, Cerrone-Szakal, A. L., and Siegfried, N. A. "Insight into the Functional Diversity of RNA Through Model-Making" *Q. Rev. Biophys.* 40, 55-85 (2007).
61. Bevilacqua, P. C.*, SantaLucia, J. Jr. "The Biophysics of RNA." *ACS Chem. Biol.* 2, 440-444 (2007).
62. McGraw, A. P., Bevilacqua, P. C.*, and Babitzke, P.* "TRAP-5' Stem-Loop Interaction Increases the Effect the Efficiency of Transcription Termination in the *Bacillus subtilis* *trpEDCFBA* Operon Leader Region by Increasing the Rate of TRAP Binding to the Nascent Transcript." *RNA* 13, 2020-2033 (2007).
63. Chadalavada, D.M., Cerrone-Szakal, A.L., and Bevilacqua, P. C.* "Wild-type is the Optimal Sequence of the HDV Ribozyme Under Cotranscriptional Conditions." *RNA* 13, 2189-2201 (2007).
64. Gong, B, Chen, J. H., Chase, E., Chadalavada, D. M., Yajima, R., Golden, B. L.*, Bevilacqua, P. C.*, and Carey, P. R.* "Direct Measurement of a pK_a Near Neutrality for the Catalytic Cytosine in the Genomic HDV Ribozyme by Raman Crystallography." *J. Am. Chem. Soc.* 129, 13335-13342 (2007).
65. Nallagatla, S. R., Hwang, J., Toroney, R., Zheng, X., Cameron, C. E.*, and Bevilacqua, P. C.* "5'-Triphosphate-Dependent Activation of PKR by RNAs with Short Stem-loops." *Science* 318, 1455-1458 (2007).(Featured paper in F1000 site)
66. Bevilacqua, P. C.* "Proton Transfer in Ribozyme Catalysis." *Ribozymes and RNA Catalysis*. D.M. Lilley and F. Eckstein eds. RSC Publishing, Cambridge, UK, pp. 11-36 (2008).
67. Bevilacqua, P. C.* and Blose, J. M. "Structures, Kinetics, Thermodynamics, and Biological Functions of RNA Hairpins." *Annu. Rev. Phys. Chem.* 59, 79-103 (2008).
68. Nallagatla, S. R., and Bevilacqua, P. C.* "Nucleoside Modifications Modulate Activation of the Protein Kinase PKR in an RNA Structure-specific Manner." *RNA* 14, 1201-1213 (2008).
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198. Jolley, E. A., Yakhnin, H., Tack, D. C., Babitzke, P.*, and **Bevilacqua, P. C.*** Transcriptome-wide probing reveals RNA thermometers that regulate translation of glycerol permease genes in *Bacillus subtilis*. *RNA* 29, 1368-1378 (2023).
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200. Williams, A. M., Jolley, E. A., Santiago-Martínez, M. G., Chan, C. X., Gutell, R. R., Ferry, J. G., **Bevilacqua, P. C.*** *In vivo* structure probing of RNA in *Archaea*: Novel insights into the ribosome structure of *Methanosarcina acetivorans*. *RNA* 29, 1610-1620 (2023).
201. Meyer, M. O., Yamagami, R., Choi, S., Keating, C. D.*, **Bevilacqua, P. C.*** RNA folding inside peptide-rich droplets reveal roles of modified nucleosides at the origin of life. *Sci. Adv.* 22, 9(38):eadh5152 (2023).
202. Sieg, J. P., Jolley, E. A., Huot, M. J., Babitzke, P. & **Bevilacqua, P. C.*** *In vivo*-like nearest neighbor parameters accurately predict fractional base-pairing in cells. *Nucleic Acids Res.* 51, 11298-11317 (2023).
203. McKinley, L. N., Kern, R. G., Assmann, S. M. & **Bevilacqua, P. C.***. Flanking sequence cotranscriptionally regulates twister ribozyme activity. *Biochemistry* 63, 53-68 (2024).
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205. Douds, C. A., Babitzke, & **Bevilacqua, P. C.*** A new reagent for *in vivo* structure probing of RNA G and U residues that improves RNA structure prediction alone and combined with DMS. *RNA* 30, 901-919 (2024).
206. McKinley, L. N., Meyer, M. O., Sebastian, A., Chang, B. K., Messina, K. J., Albert, I. & Bevilacqua, P. C.* Direct testing of natural twister ribozymes from over a thousand organisms reveals a broad tolerance for structural imperfections. *Nucleic Acids Res.* (2024) in press.

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Patents

Bevilacqua, P. C., Kwok, C. K., Assmann, S. M., Ding, Y. “Low Sequence Bias Single-Stranded DNA Ligation” US Patent No. 9,816,120.

Invited Talks (since 2006)

2024 University of Texas, Austin. Austin, TX.
2024 Baylor Medical College, THINC, Houston, PA.
2024 Juniata College, Huntingdon, PA.
2024 RNA Rustbelt Meeting RRM 2024, Keynote Speaker, Newark, OH.
2024 38th Annual Gibbs Conference on Biothermodynamics, Carbondale, IL.
2024 Post-transcriptional Gene Regulation in Plants (PGRP), Banyuls-sur-mer, FRANCE
2024 Centre for Genomic Regulation, Barcelona, SPAIN
2024 Telluride Workshop on "Nucleic Acids Chemistry", Telluride, CO
2024 Gordon Conference "The Versatility of RNA in the Living World", Portland, ME
2024 ACS MARM, University Park, PA
2024 ACS Meeting, New Orleans, LA
2024 John Carroll University, ACES (Adult Continuing Education Series) (Webinar)
2023 Siena College, Loudonville, NY
2023 Harvard U./NSF Life in the Universe, Harvard, MA
2023 Telluride RNA Dynamics, Telluride, CO
2023 Merck Inc. mRNA vaccine unit, West Point, PA
2023 Penn State Symposium Structured Nucleic Acids (University Park, PA)
2023 Pittcon, Philadelphia, PA
2022 Ribo-Club 2022, Orford QUEBEC
2022 NIGMS Molecular Biophysics T32 Training Program Symposium at Northwestern University
2022 ACS Meeting, Chicago, IL
2022 Telluride Workshop on Nucleic Acids Chemistry, Telluride CO
2022 23rd Penn State Plant Biology Symposium
2022 123rd International Titisee Conference, Titisee GERMANY
2021 Pacificchem (virtual)
2021 NSF-sponsored Cross-disciplinary Study of Post-transcriptional and Post-translational Modifications (virtual)
2021 Emory University, Atlanta, GA, Department of Biochemistry
2021 NCI RNA Biology Initiative Seminar Series, Frederick MD (virtual)
2021 Telluride Workshop on RNA Dynamics, Telluride CO
2021 RNA Structure Symposium, (Dr. R. Spitale host) (virtual)
2020 University of Maryland, Baltimore County, Department of Chemistry & Biochemistry, Baltimore, MD.
2020 Bermuda Principles, Impact on Transcriptomics, Southampton, Bermuda Keynote Speaker.
2020 Gordon Research Conference on Origins of Life, Galveston, TX
2019 University of California San Diego (UCSD), Dept of Chemistry and Biochemistry, San Diego, CA.
2019 CalTech, Biochemistry Seminar, Pasadena, CA.
2019 Jet Propulsion Laboratory (JPL-NASA), Planetary Chemistry and Astrobiology, Pasadena, CA.
2019 ETH Swiss Federal Institute of Tech, Swiss RNA Biology Programme. Zürich, SWITZERLAND.
2019 Bern University, Swiss RNA Biology Programme. Bern, SWITZERLAND
2019 Duke University RNA Tool & Target, Durham, NC. Keynote Lecture.
2019 CEGR NIH T32 Training Grant Retreat. Boalsburg, PA
2019 Bloomsburg Univ. Bloomsburg, PA
2019 258th ACS Meeting. San Diego, CA (two talks)
2019 AbSciCon 2019 Meeting. Bellevue, WA.
2018 Kaufman Awardees Meeting. Pittsburgh, PA.
2018 Gibbs Biological Thermodynamics Meeting. Carbondale, IL.
2018 NSF PGRP Awardees Meeting. Arlington, VA.
2018 Telluride Workshop on Nucleic Acids Chemistry, Telluride, CO.
2018 EMBO Workshop. RNA: Structure meets function. Stockholm archipelago, SWEDEN.
2018 Ohio State University CMP/RNA Biology Symposium, Keynote Lecture.
2018 Johns Hopkins University, Department of Biophysics (Homewood Campus) Baltimore, MD.
2018 255th American Chemical Society Meeting. BIOL Symposium, New Orleans, LA.
2018 University of Florida, Gainesville, FL.
2018 University of Michigan (Gomberg Lecturer), Ann Arbor, MI.
2017 McMaster University, Hamilton, CANADA.
2017 University of Waterloo, Waterloo, CANADA.
2017 Iowa State University, Ames, IA.
2017 Penn State College of Medicine, Hershey, PA

2017 Hunter College, NY, NY.
 2017 Syracuse University, Syracuse, NY.
 2016 5th Zing Nucleic Acids Conference, Tampa, FL.
 2016 Solvay Conference on Chemistry, Brussels, BELGIUM.
 2016 Telluride Workshop on Nucleic Acid Chemistry, Telluride, CO.
 2016 Canadian Society for Chemistry (CSC), Workshop on Advances in Nucleic Acid Chemistry and Technology Symposium. Halifax, Nova Scotia, CANADA.
 2016 SISSA (International School for Advanced Studies), Workshop on RNA Structure, Dynamics, Function, Trieste, ITALY.
 2016 University of Massachusetts, Worcester MA.
 2016 University of Zürich, Zürich, SWITZERLAND.
 2016 London Imperial College, London, UNITED KINGDOM.
 2016 University of Oregon, Eugene OR.
 2016 251st American Chemical Society Meeting. BIOL Symposium, San Diego, CA
 2016 Rutgers University, Piscataway, NJ
 2015 Pacificchem: "*Functional Nucleic Acids: Chemistry, Biology, and Materials Applications*", Honolulu, HI
 2015 Denison University, Granville, OH
 2015 Case Western Reserve University, Cleveland, OH
 2015 ACS Meeting, Boston, MA
 2015 Telluride Workshop on RNA Dynamics, Telluride, CO
 2015 University of Illinois, Urbana-Champaign, Urbana, IL
 2015 24th Enzyme Mechanism Conference, Galveston, TX
 2014 UNC, Chapel Hill, Chapel Hill, NC.
 2014 RiboClub, Sherbrooke Québec, CANADA
 2014 Carnegie Mellon University, Pittsburgh, PA
 2014 Telluride Workshop on Challenges in RNA Structural Modeling and Design, Telluride, CO
 2014 Cornell University, CHESS Users Meeting, Ithaca, NY
 2014 Scripps Florida, Jupiter, FL
 2014 University of Maryland, IBBR, NIST, Rockville, MD
 2014 Gettysburg College, Gettysburg, PA
 2014 Saint Francis University, Loretto, PA
 2013 Finger Lakes RNA Conference, Canandaigua, NY
 2013 ACS Meeting, Indianapolis, IN
 2013 Telluride Workshop on RNA Dynamics, Telluride, CO
 2013 ACS Meeting, New Orleans, LA
 2013 Ohio State University, Department of Chemistry & Biochemistry, Columbus, OH
 2013 Drexel University, Department of Biology, Philadelphia, PA
 2012 FASEB Meeting (Snowmass, CO)
 2012 RNA Meeting (Ann Arbor, MI)
 2012 Saint Louis University, Department of Chemistry, St. Louis, MO
 2012 University of California, LA, CNSI (California NanoSystems Institute)
 2012 University of California, Irvine, Department of Chemistry, Irvine, CA
 2011 Telluride Workshop on RNA Dynamics, Telluride, CO
 2011 ACS Meeting, Denver, CO
 2011 XCare Mexico, Zing Meeting on Enzymes, Coenzymes, and Metabolic Pathways
 2010 Franklin & Marshall College, Department of Chemistry, Lancaster, PA
 2010 University of Southern California (USC), Department of Chemistry, Los Angeles, CA
 2010 Cornell University, Biophysics Colloquium, Applied and Engineering Physics, Ithaca, NY
 2010 Rensselaer Polytechnic Institute (RPI), Dept of Physics, Applied Physics and Astronomy, Troy, NY
 2010 Telluride Workshop on Nucleic Acids Chemistry, Telluride, CO
 2010 Puerto Morelos, MEXICO, Zing Conference on Nucleic Acid
 2010 Pacificchem: "*New Frontiers of Functional Nucleic Acids*", Honolulu, HI
 2009 Penn State Altoona, Department of Biology, Altoona, PA
 2009 Telluride Workshop on RNA Dynamics, Telluride, CO
 2009 Plant Biology Symposium, Pennsylvania State University, University Park
 2008 2008 Biophysical Society Annual Meeting, Long Beach, CA
 2008 Carnegie Mellon University, Department of Chemistry, Pittsburgh, PA
 2008 Peking University, Dept Biochemistry and Molecular Biology, Life Sciences College, Beijing, China.
 2008 Peking University, Dept Biochemistry and Molecular Biology, Life Sciences College, Beijing, China.

2008 2008 FASEB Meeting on Nucleic Acid Enzymes, Saxton's River, VT.
 2008 Arnold and Mabel Beckman Center, 20th Annual Symposium on Kavli Frontiers of Science, Irvine, CA
 2007 American Chemical Society Meeting, Chicago, IL
 2007 Wayne State University, Department of Chemistry, Detroit MI
 2007 Santa Fe Institute Workshop, "*Nucleic Acids—The First Billion Years*"
 2007 Wesleyan University, Department of Molecular Biology and Biochemistry, Middletown, CT
 2006 Université de Montréal, Department of Biochemistry, Montreal, CANADA
 2006 Institute of Research in Immunology and Cancer (IRIC). Université de Montréal, Montreal, CANADA
 2006 Kobe, JAPAN, 2nd International Symposium on Biomolecular Chemistry (ISBC)
 2006 University of Rochester, Department of Chemistry, Rochester, NY
 2006 University of Michigan, Department of Chemistry, Ann Arbor, MI