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PROFESSIONAL EXPERIENCE

Professor **July 2019 – Present**

The Pennsylvania State University, Department of Chemistry, Department of Biochemistry and Molecular Biology
University Park, PA

Associate Professor **July 2015 – June 2019**

The Pennsylvania State University, Department of Biochemistry and Molecular Biology
University Park, PA

Associate Professor **July 2014 – June 2019**

The Pennsylvania State University, Department of Chemistry
University Park, PA

Assistant Professor **July 2008 – June 2014**

The Pennsylvania State University, Department of Chemistry
University Park, PA

EDUCATION

Post-Doctoral Fellow **January 2005 – June 2008**

National High Magnetic Field Laboratory and
Florida State University Department of Chemistry and Biochemistry
Tallahassee, FL
Advisor: Rafael Brüschweiler

Doctor of Philosophy **July 1999 – December 2004**

Washington University School of Medicine
Department of Biochemistry and Molecular Biophysics
St. Louis, MO
Advisor: Kathleen B. Hall

Bachelor of Science **September 1995 – May 1999**

Cornell University
Ithaca, NY
Research Advisor: Linda K. Nicholson

HONORS AND AWARDS

Fellow of the American Association for the Advancement of Science, 2022
Eberly College of Science Distinguished Faculty Mentoring Award, 2019
EAS New Faculty Award in NMR Spectroscopy, Sponsored by Agilent Technologies, 2012

NSF CAREER Award, 2010-2014
National Institutes of Health NRSA Postdoctoral Fellowship, 2005-2008
National Institutes of Health Biophysics Training Grant, 2003-2004
National Science Foundation Predoctoral Fellowship, 2000-2003
Graduate with Honors and Distinction, Cornell University, 1999
Howard Hughes Summer Undergraduate Research Fellowship, 1998

MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

Associate Member, Penn State Cancer Institute, 2017-Present
ASBMB, 2014-Present
Biophysical Society, 2009-Present
American Association for the Advancement of Science, 2008-Present
American Chemical Society, 2000-Present
RNA Society, 2009-2012

PROFESSIONAL ACTIVITIES

Editorial Positions

2020- Editorial Board Member, Biophysical Journal
2017- Editorial Board Member, Journal of Biological Chemistry

National Service Positions

2018-2020 Councilor, Biophysical Society Intrinsically Disordered Protein Subgroup
Executive Committee

Review Panels

2018-2022 Member (Appointed), Enabling Bioanalytical and Imaging Technology Study
Section, NIH
2017 Member (Ad Hoc), Enabling Bioanalytical and Imaging Technology Study
Section, NIH
2016 Member (Ad Hoc), Biological Chemistry and Macromolecular Biophysics, High
End Instrumentation Study Section, NIH
2017, 2019 Member, Biophysics Review Panel, Molecular and Cellular Biosciences, NSF
2015 Member, CAREER Panel – Molecular and Cellular Biosciences, NSF
2014-2018 Member, DNA Mechanisms in Cancer, American Cancer Society
2014-2015 Member (Ad Hoc), Macromolecular Structure and Function B Study Section, NIH
2012, 2014 Member, Committee on Proposal Evaluation for Allocation of Supercomputing
Time for the Study of Molecular Dynamics, NRC
2010 Member, Major Research Instrumentation Review Panel, NSF
2010-Present Ad Hoc Reviewer, Molecular and Cellular Biosciences, NSF

Meeting Organization

2021, '23 Co-Organizer, Telluride Workshop on Intrinsically Disordered Proteins
2019 Organizer, Pinhead Institute Camp: Chemistry is the Solution
2018, '20, '22 Co-Organizer, Telluride Workshop on Biomolecular Interactions in the Cellular
Environment
2018 Co-Organizer, IDP Subgroup Symposium, Biophysical Society National Meeting
2017 Co-Organizer, 31st Gibbs Conference on Biothermodynamics
2015 Co-Organizer, Symposium on Protein Non-Folding as a Regulatory
Phenomenon, ASBMB National Meeting

2015 Co-Organizer, Telluride Workshop on RNA Dynamics
2014 Chair, Eastern Analytical Symposium Session: Frontiers in Biological NMR Spectroscopy

Notable Penn State Committees (recent)

2021-2023 Graduate Council Joint Curriculum Committee
2017-2020 Graduate Program Chair and Graduate Advisor, Chemistry Graduate Program
2015 Eberly College of Science Ethics Fellow
2015 Chair, Paul Berg Prize Selection Committee
2015 -2020 Huck Institutes for the Life Sciences, Mass Spectrometry Facility Steering Committee
2014 - Huck Institutes for the Life Sciences, Automated Biomolecular Calorimetry Facility Steering Committee

FUNDING

Awarded

Title: Structure and Mechanism of Transcription Factors in Pancreatic Beta Cells
Period: July 1, 2019 – June 30, 2023
Sponsor: National Institutes of Health
R01 DK121509
Role: PI

Title: Carbon-Detected NMR Studies of Intrinsically Disordered Protein Post-Translational Modification
Period: August 1, 2019 – July 31, 2023
Sponsor: National Science Foundation, MCB
MCB-1932730
Role: PI

Title: Acetyllysine Structure-Function Analysis by ¹³C Direct-Detect NMR Spectroscopy
Period: May 1, 2020 – April 30, 2024 (in no-cost extension)
Sponsor: National Institutes of Health
1 R21 GM137129
Role: Principal Investigator

Title: Eukaryotic Gene Regulation (EGR) Predoctoral Training Program
Period: September 1, 2018 – August 31, 2023
Sponsor: National Institutes of Health
1 T32 GM125592
Role: Faculty (Pugh, PI)

Completed

Title: Carbon-Detected NMR Studies of Intrinsically Disordered Protein Structure and Function
Period: July 15, 2015 – June 30, 2019
Sponsor: National Science Foundation, MCB
MCB-1515974
Role: PI

Title: Specificity of miRNA Processing Provided by Double-Stranded RNA Binding Domains
Period: September 1, 2011 – August 31, 2016 (In final no-cost extension through 08/2018)

Sponsor: National Institutes of Health
1 R01 GM098451
Role: PI

Title: Administrative Supplement to Promote Diversity for Parent Grant R01 GM098451
Period: September 1, 2011 – August 31, 2016
Sponsor: National Institutes of Health
R01GM098451-S1
Role: PI

Title: CAREER: Carbon-Detected NMR Methods for the Study of Intrinsically Disordered Proteins
Period: January 1, 2010 – December 31, 2014
Sponsor: National Science Foundation
MCB-0953918
Role: PI

Title: Acquisition of High Throughput Calorimeter for Ligand-Biopolymer Discovery and Characterization
Period: September 1, 2009 – August 31, 2012
Sponsor: National Science Foundation – MRI
MRI-0922974
Role: coPI

Title: Assessment of Multi-Microsecond Simulations of Intrinsically Disordered Proteins Using NMR: Applications to PDX1
Period: April 1, 2012 – August 31, 2012
Sponsor: Pittsburgh Supercomputer Center
Role: PI

Title: Assessment of Multi-Microsecond Simulations of Intrinsically Disordered Proteins Using NMR: Applications to FCP1 in the Unbound State
Period: April 1, 2011 – August 31, 2011
Sponsor: Pittsburgh Supercomputer Center
MCB110027P
Role: PI

Completed Awards to Laboratory Personnell

Title: The Molecular Mechanisms of Pdx1 Destabilization by SPOP
Period: January 1, 2020 – December 31, 2022
Sponsor: National Institutes of Health
1 F31 DK124047

Title: Biophysical Characterization of PDX1 Interactions with DNA and other Transcription Factors
Period: June 1, 2012 – May 31, 2015
Sponsor: National Institutes of Health
1 F31 GM101936
Role: Sponsor

PUBLICATIONS

- (a) Principal Author
- (b) Co-Author
- (c) Supervising Author

Researcher ID: A-1655-2012

ORCID: 0000-0001-5179-032X

Web of Science Search: showalter sa OR (showalter s AND bruschweiler r)

MyBibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/scott.showalter.1/bibliography/43307530/public/?sort=date&direction=descending>

Peer-reviewed Publications

1. (c) Fraser, O.A., Dewing, S.M., Usher, E.T., George, C., Showalter, S.A. A Direct Nuclear Magnetic Resonance Method to Investigate Lysine Acetylation of Intrinsically Disordered Proteins. *Front. Mol. Biosci.* 2022: 9, 1074743. PMCID: PMC9853081.
2. (c) Usher, E.T., Showalter S.A. Biophysical Insights into Glucose-Dependent Transcriptional Regulation by PDX1. *J. Biol. Chem.* 2022: 298, 102623. PMCID: PMC9691942.
3. (c) Usher, E.T., Namitz, K.E.W., Cosgrove, M.S., Showalter, S.A. Probing Multiple Enzymatic Methylation Events in Real Time with NMR Spectroscopy. *Biophys. J.* 2021: 120, 4710-4721. PMCID: PMC8595733.
4. (c) Prieto, V.A., Namitz, K.E.W., Showalter, S.A. Electrostatic Interactions between Fcp1 and Rap74 Bias the Conformational Ensemble of the Complex with Minimal Impact on Binding Affinity. *J. Phys. Chem. B* 2021: 125, 10917-10927.
5. (c) Usher, E.T., Sabri, N., Rohac, R., Boal, A.K., Mittag, T., Showalter, S.A. Intrinsically Disordered Substrates Dictate SPOP Subnuclear Localization and Ubiquitination Activity. *J. Biol. Chem.* 2021; 296, 100693. PMCID: PMC8138767.

Selected as an Editor's Pick

6. (c) Usher, E.T., Showalter, S.A. Mapping Invisible Epitopes by NMR Spectroscopy. *J. Biol. Chem.* 2020; 295, 17411-17412. PMID: in process.
7. (b) Morley, V.J., Kinnear, C.L., Sim, D.G., Olsen, S.N., Jackson, L., Hansen, E., Usher, G.A., Showalter, S.A., Pai, M.P., Woods, R.J., Read, A.F. An adjunctive therapy prevents enrichment of antibiotic-resistant clones of a colonizing opportunistic pathogen. *eLife* 2020; 9, e58147. PMCID: PMC7707840
8. (c) Pabit, S.A., Chen, Y.-L., Usher, E.T., Cook, E.C., Pollack, L., Showalter, S.A. Elucidating the Role of Microprocessor Protein DGCR8 in Bending RNA Structures. *Biophys. J.* 2020; 119, 2524-2536. PMID: 33189689.
9. (c) Showalter, SA. Reviving Protein-Observed ¹⁹F Lineshape Analysis for Deep Insight into Protein-Ligand Binding Events. *Biophys J.* 2020; 118, 2333-2335. PMCID: PMC7231914

10. (b) Sloand, JN, Nguyen, TT, Zinck, SA, Cook, EC, Zimudzi, TJ, Showalter, SA, Glick, AB, Simon, JC, Medina, SH. Ultrasound-Guided Cytosolic Protein Delivery via Transient Fluorous Masks. *ACS Nano* 2020; 14, 4061-4073. PMID: 32134630
11. (c) Cook, EC, Sahu, D, Bastidas, M, Showalter, SA. The Solution Ensemble of the C-Terminal Domain from the Transcription Factor Pdx1 Resembles an Excluded Volume Polymer. *J. Phys. Chem. B.* 2019; 123: 106-116. PMID: 30525611
12. (b) Cook, EC, Featherston, ER, Showalter, SA, Cotruvo, JA. Structural Basis for Rare Earth Element Recognition by *Methylobacterium extorquens* Lanmodulin. *Biochemistry.* 2019 58: 120-125. PMID: 30352145
13. (c) Cook, EC, Usher, GA, Showalter, SA. The use of ¹³C Direct-Detect NMR to Characterize Flexible and Disordered Proteins. *Methods Enzymol.* 2018; 611: 81-100. PMID: 30471706
14. (b) Burkholder, NT, Medellin, B, Irani, S, Matthews, W, Showalter, SA, Zhang, YJ. Chemical Tools for Studying the Impact of *cis/trans* Prolyl Isomerization on RNA Polymerase II Phosphatase Activity and Specificity. *Methods Enzymol.* 2018; 607: 269-297. PMID: 30149861
15. (c) Gibbs, EB, Laremore, TN, Usher, GA, Portz, B, Cook, EC, Showalter, SA. Substrate Specificity of the Kinase P-TEFb Towards the RNA Polymerase II C-Terminal Domain. *Biophys J.* 2017; 113: 1909-1911. PMCID: PMC5685781
16. (c) Kranick, JC, Chadalavada, DM Sahu, D, Showalter, SA. Engineering Double-Stranded RNA Binding Activity into the Drosha Double-Stranded RNA Binding Domain Results in a Loss of MicroRNA Processing Function. *PLoS One.* 2017; 12: e0182445. PMCID: PMC5549741
17. (c) Gibbs, EB, Cook, EC, Showalter, SA. Application of NMR to Studies of Intrinsically Disordered Proteins. *Arch Biochem Biophys.* 2017; 628: 57-70. PMID: 28502465
18. (c) Gibbs, EB, Lu, F, Portz, B, Fisher, MJ, Medellin, BP, Laremore, TN, Zhang, YJ, Gilmour, DS, Showalter, SA. Phosphorylation Induces Sequence-Specific Conformational Switches in the RNA Polymerase II C-Terminal Domain. *Nat Commun.* 2017; 8: 15233. PMCID: PMC5437310
19. (b) Portz, B, Lu, F, Gibbs, EB, Mayfield, JE, Mehaffey, MR, Zhang, YJ, Brodbelt, JS, Showalter, SA, Gilmour, DS. Structural Heterogeneity in the Intrinsically Disordered RNA Polymerase II C-terminal Domain. *Nat Commun.* 2017; 8: 15231. PMCID: PMC5437306
20. (c) Gibbs, EB, Showalter, SA. Quantification of Compactness and Local Order in the Ensemble of the Intrinsically Disordered Protein FCP1. *J Phys Chem B.* 2016; 120: 8960-8969. PMID: 27551949
21. (c) Acevedo, R, Evans, D, Penrod, KA, & Showalter, SA. Binding by TRBP-dsRBD2 does not induce bending of double-stranded RNA. *Biophys J.* 2016; 110: 2610-2617. PMCID: PMC4919420
22. (c) Sahu, D, Bastidas, M, Lawrence, CW, Noid, WG, & Showalter, SA. Assessing Coupled Protein Folding and Binding through Temperature-Dependent Isothermal Titration

- Calorimetry. *Methods Enzymol.* 2016; 567: 23-45. PubMed PMID: 26794349 PMCID: In Process
23. (b) Yennawar, NH, Fecko, JA, Showalter, SA, Bevilacqua, PC A High-Throughput Biological Calorimetry Core – Steps to Startup, Run, and Maintain a Multi-User Facility. *Methods Enzymol.* 2016; 567: 435-460. PubMed PMID: 26794364 PMCID: In Process
24. (c) Bastidas, M, Gibbs, EB, Sahu, D, Showalter, SA. A Primer for Carbon-Detected NMR Applications to Intrinsically Disordered Proteins in Solution. *Con Mag Reson A.* 2015; 44A: 54-66. PMCID: In Process
25. (c) Quarles, KA, Chadalavada, D, Showalter, SA. Deformability in the Cleavage Site of Primary MicroRNA is Not Sensed by the Double-Stranded RNA Binding Domains in the Microprocessor Component DGCR8. *Proteins Struct Funct Bioinf.* 2015; 83: 1165-1179. PMCID: PMC4446130
26. (c) Gibbs, EB, Showalter, SA. Quantitative Biophysical Characterization of Intrinsically Disordered Proteins. *Biochemistry.* 2015; 54: 1314-1326. PubMed PMID: 25631161
27. (c) Acevedo, R, Orench-Rivera, N, Quarles, KA, Showalter, SA. Helical Defects in MicroRNA Influence Protein Binding by TAR RNA Binding Protein. *PLoS One.* 2015; 10: e0116749. PMCID: PMC4301919
28. (b) Cordek, DG, Croom-Perez, TJ, Hwang, J, Hargittai, MRS, Subba-Reddy, CV, Han, Q, Lodeiro, MF, Ning, G, McCrory, TS, Arnold, JJ, Koc, H, Lindenbach, BD, Showalter, SA, Cameron, CE. Expanding the proteome of an RNA virus by phosphorylation of an intrinsically disordered viral protein. *J Biol Chem.* 2014; 289: 24397-24416. PMCID: PMC4148867.
29. (a) Showalter, SA. Intrinsically Disordered Proteins: Methods for Structure and Dynamics Studies. *eMagRes.* 2014; 3: 181-190.
30. (c) Lawrence, CW, Kumar, S, Noid, WG, Showalter, SA. The Role of Ordered Proteins in the Folding-Upon-Binding of Intrinsically Disordered Proteins. *J Phys Chem Lett.* 2014; 5: 833-838. PubMed PMID: 26274075.
31. (c) Sahu, D, Bastidas, M, Showalter, SA Generating NMR Chemical Shift Assignments of Intrinsically Disordered Proteins Using Carbon-Detect NMR Methods. *Anal Biochem.* 2014; 449: 17-25. PMCID: PMC3944900
32. (c) Bastidas, M, Showalter, SA. Thermodynamic and Structural Determinants of Differential Pdx1 Binding to Elements from the Insulin and IAPP Promoters. *J Mol Biol.* 2013; 425: 3360-3377. PMCID: PMC3800017
33. (b) Kumar, S, Showalter, SA, Noid, WG. Native-Based Simulations of the Binding Interaction Between RAP74 and the Disordered FCP1 Peptide. *J Phys Chem B.* 2013; 117: 3074-3085. PubMed PMID: 23387368
34. (c) Quarles, KA, Sahu, D, Havens, MA, Forsyth, ER, Wostenberg, C, Hastings, ML, Showalter, SA. Ensemble Analysis of Primary MicroRNA Structure Reveals an Extensive

Capacity to Deform near the Drosha Cleavage Site. *Biochemistry*. 2013; 52: 795-807.
PMCID: PMC3565094

35. (c) Wostenberg, C, Lary, JW, Sahu, D, Acevedo, R, Quarles, KA, Cole, JL, Showalter, SA. The Role of Human Dicer-dsRBD in Processing Small Regulatory RNAs. *PLoS One* 2012; 7: e51829. PMCID: PMC3521659
36. (b) Myers, CP, Sun, S, Showalter, SA, Miller, JR, Williams, ME. NMR Investigations of the Solution Structures of Ru-Zn Complexes Tethered by Oligo(aminoethylglycine) chains. *Polyhedron*. 2012; 40: 118-124.
37. (c) Lawrence, CW, Showalter, SA. Carbon-Detected ^{15}N NMR Spin Relaxation of an Intrinsically Disordered Protein: FCP1 Dynamics Unbound and in Complex with RAP74. *J Phys Chem Lett*. 2012; 3: 1409-1413. PubMed PMID: 26286791
38. (c) Wostenberg, C, Kumar, S, Noid, WG, Showalter, SA. Atomistic Simulations Reveal Structural Disorder in the RAP74-FCP1 Complex. *J Phys Chem B*. 2011; 115: 13731-13739. PubMed PMID: 21988473
39. (c) Lawrence, CW, Bonny, A, Showalter, SA. The Disordered C-Terminus of the RNA Polymerase II Phosphatase FCP1 is Partially Helical in the Unbound State. *Biochem Biophys Res Comm*. 2011; 410: 461-465. PubMed PMID: 21672523
40. (c) Wostenberg, C, Quarles, KA, Showalter, SA. Dynamic Origins of Differential RNA Binding Function in Two dsRBDs from the miRNA 'Microprocessor' Complex. *Biochemistry*. 2010; 49: 10728-10736. PMCID: PMC3565223
41. (b) Li, D-W, Showalter, SA, Brüschweiler, R. Entropy Localization in Proteins. *J Phys Chem B*. 2010; 114: 16036-16044. PubMed PMID: 21077640
42. (c) Wostenberg, C, Noid, WG Showalter, SA. MD Simulations of the dsRBP DGCR8 Reveal Correlated Motions that may Facilitate pri-miRNA Binding. *Biophys J*. 2010; 99: 248-256. PMCID: 2895372
43. (a)(c) Showalter, SA. NMR Assignment of the Intrinsically Disordered C-terminal Region of Homo sapiens FCP1 in the Unbound State. *Biomol NMR Assign*. 2009; 3: 179-181. PubMed PMID: 19888685.
44. (c) O'Hare, B, Benesi, AJ, Showalter, SA. Incorporating ^1H -Chemical Shift Determination into ^{13}C -Direct Detected Spectroscopy of Intrinsically Disordered Proteins in Solution. *J Mag Reson*. 2009; 200: 354-358. PubMed PMID: 19648037
45. (b) Levine, LA, Kirin, SI, Myers, CP, Showalter, SA, Williams, ME. Heterometallic Ferrocene-Rhenium Complexes Linked by an Aminoethylglycine Scaffold. *Eur J Inorg Chem*. 2009; 2009: 613-621.

Publications prior to Penn State

46. (b) Markwick, PRL., Showalter, SA, Bouvignies, G, Brüschweiler, R, Blackledge, M. Structural Dynamics of Protein Backbone ϕ Angles: Extended Molecular Dynamics

Simulations versus Experimental ^3J Scalar Couplings. *J Biomol NMR*. 2009; 45: 17-21.
PubMed PMID: 19629714

47. (b) Salmon, L, Bouvignies, G, Markwick, P, Lakomek, N, Showalter, S, Li, D-W, Walter, K, Griesinger, C, Brüschweiler, R, Blackledge, M. Protein Conformational Flexibility from Structure-Free Analysis of NMR Dipolar Couplings: Quantitative and Absolute Determination of Backbone Motion in Ubiquitin. *Angew Chem Int Ed*. 2009; 48: 4154-4157. PubMed PMID: 19415702.
48. (a) Showalter, SA, Bruschweiler-Li, L, Johnson, E, Zhang, F, Brüschweiler, R. Quantitative Lid Dynamics of MDM2 Reveals Differential Ligand Binding Modes of the p53-Binding Cleft. *J Am Chem Soc*. 2008; 130: 6472-6478. PubMed PMID: 1845534
49. (b) Johnson, E, Showalter, SA, Brüschweiler, R. A Multifaceted Approach to the Interpretation of NMR Order Parameters: A Case Study of a Dynamic α -Helix. *J Phys Chem B*. 2008; 112: 6203-6210. PubMed PMID: 18376887
50. (b) Johnson, E, Bruschweiler-Li, L, Showalter, SA, Vuister, G, Zhang, F, Brüschweiler, R. Structure and Dynamics of Ca^{2+} -Binding Domain 1 of the $\text{Na}^+/\text{Ca}^{2+}$ Exchanger In the Presence and in the Absence of Ca^{2+} . *J Mol Biol*. 2008; 377: 945-955. PMCID: PMC2702724
51. (a) Showalter, SA, Johnson, E, Rance, M, Brüschweiler, R. Toward Quantitative Interpretation of Methyl-Side Chain Dynamics by Molecular Dynamics Simulations. *J Am Chem Soc*. 2007; 129: 14146-14147. PubMed PMID: 17973392
52. (a) Showalter, SA, Brüschweiler, R. Quantitative Molecular Ensemble Interpretation of NMR Dipolar Couplings without Restraints. *J Am Chem Soc*. 2007; 129: 4158-4159. PubMed PMID: 17367145
53. (a) Showalter, SA, Brüschweiler, R. Validation of Molecular Dynamics Simulations of Biomolecules Using NMR Spin Relaxation as Benchmarks: Application to the AMBER99SB Force Field. *J Chem Theory Comput*. 2007; 3: 961-975. PubMed PMID: 26627416
54. (a) Showalter, SA, Hall, KB. Correlated Motions in the U1A snRNA Stem/Loop 2:U1A RBD1 Complex. *Biophys J*. 2005; 89: 2046-2058. PMCID: PMC1366707
55. (a) Showalter, SA, Baker, NA, Tang, C, Hall, KB. Iron Responsive Element RNA Flexibility Described by NMR and Isotropic Reorientational Eigenmode Dynamics. *J Biomol NMR*. 2005; 32: 179-193. PubMed PMID: 16132819
56. (a) Showalter, SA, Hall, KB. Isotropic Reorientational Eigenmode Dynamics Compliments NMR Relaxation Measurements for RNA. *Methods Enzymol*. 2005; 394: 465-480. PubMed PMID: 15808233
57. (a) Showalter, SA, Hall, KB. Altering the RNA-Binding Mode of the U1A RBD1 Protein. *J Mol Biol*. 2004; 335: 465-480. PubMed PMID: 14672656
58. (a) Showalter, SA, Hall, KB. A Functional Role for Correlated Motion in the N-Terminal RNA Binding Domain of Human U1A Protein. *J Mol Biol*. 2002; 322: 533-542. PubMed PMID: 12225748

Oral Presentations

1. (invited PSU) Showalter, SA, "Structural Biophysics of Eukaryotic Gene Regulation." Telluride Workshop on Biomolecular Interactions in the Cellular Environment, Telluride, CO, July 18, 2022.
2. (invited PSU) Showalter, SA, "Punk Science: The Chemistry of Color" Pinhead Institute Punk Science Seminar Series, Telluride CO, July 12, 2022; Ridgway, CO, July 13, 2022.
3. (invited PSU) Showalter, SA. "Disordered Proteins in Control: Regulating Transcription in Eukaryotes." Department of Chemistry and Chemical Biology, Indiana University Purdue University Indianapolis, Indianapolis, IN, March 2, 2022.
4. (invited PSU) Showalter, SA. "NMR Studies of Lysine Posttranslational Modification." 6th Annual Gateway NMR Conference, held via Zoom, September 17, 2021.
5. (invited PSU) Showalter, SA. "NMR Studies of Lysine Post-Translational Modification." Telluride Workshop on Intrinsically Disordered Proteins, Telluride, CO, July 16, 2021.
6. (invited PSU) Showalter, SA., Bevilacqua, PC., and Hall, KB. "Serendipity in Science: Why Basic Science Matters and how Developments in Molecular Biology Prepare us for the Unknown to Come." Telluride Science Town Talks, Telluride, CO, July 13, 2021.
7. (invited PSU) Showalter, SA. "(Un)Structural Biology and the Mechanisms of Regulated Gene Expression." Department of Chemistry, Wichita State University, Wichita, KS, April 7, 2021.
8. (invited PSU) Showalter, SA. "Carbon-Detected NMR Studies of Intrinsically Disordered Protein Post-Translational Modification." IDP Seminars Virtual Symposium, March 18, 2021.
9. (invited PSU) Showalter, SA. "'Structural Biophysics of Eukaryotic Gene Regulation.'" Telluride Workshop on Biomolecular Interactions in the Cellular Environment, Telluride, CO, August 6, 2020.
10. (invited PSU) Showalter, SA. "Disordered Proteins in Control: Regulating Transcription in Eukaryotes." Telluride Science Summer Lecture Series, Telluride, CO, July 31, 2020.
11. (invited PSU) Showalter, SA. "How an NMR Spectroscopist Discovered Eukaryotic Gene Regulation." Department of Biochemistry and Molecular Biophysics, Washington University in St. Louis, St. Louis, MO, July 24, 2020.
12. (invited PSU) Showalter, SA. "¹³C Direct-Detect NMR of Intrinsically Disordered Proteins." 61st Experimental Nuclear Magnetic Resonance Conference, Baltimore, MD, March 8, 2020.
13. (invited PSU) Showalter, SA. "(Un)Structural Biology and the Mechanisms of Regulated Gene Regulation." The University of Toronto Mississauga, February 26, 2020.
14. (Contributed PSU) Usher, GA., Showalter SA. "Regulation of Transcription Factor Stability by Ubiquitin Ligase Adaptor SPOP." 64th Annual Meeting of the Biophysical Society, San Diego, CA, February 18, 2020.

15. (Contributed PSU) Usher, GA., Showalter SA. "Regulation of Transcription Factor Stability by Ubiquitin Ligase Adaptor SPOP." 33rd Gibbs Conference on Biothermodynamics, Carbondale, IL, October 7, 2019.
16. (invited PSU) Showalter, SA. "Regulation of Eukaryotic Gene Expression by IDPs." Telluride Workshop on Intrinsically Disordered Proteins, Telluride, CO, July 19, 2019.
17. (invited PSU) Showalter, SA. "A Lack of Folding and Yet a Function: Thermodynamic Insights into Intrinsically Disordered Proteins and Transcription." 32nd Gibbs Conference on Biothermodynamics, Carbondale IL, October 8, 2018.
18. (invited PSU) Showalter, SA. "Punk Science: Mining Chemistry" Pinhead Institute Punk Science Seminar Series, Telluride, CO, July 17, 2018; Ridgway, CO, July 18, 2018.
19. (invited PSU) Showalter, SA. "Structural Biophysics of Eukaryotic Gene Regulation." Telluride Workshop on Protein-Peptide Interactions in Cellular Environments, Telluride, CO, July 17, 2018.
20. (invited PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." University of Utah, April 13, 2018.
21. (invited PSU) Showalter, SA. "RNA Structure Drives RNA-dsRBD Interactions in miRNA Processing." Indiana University, March 26, 2018.
22. (invited PSU) Showalter, SA. "A Lack of Folding, and yet a Function: Structural Insights into Intrinsically Disordered Proteins and Transcription." University of Texas, Austin, November 13, 2017.
23. (invited PSU) Showalter, SA. "A Lack of Folding, and yet a Function: Structural Insights into Intrinsically Disordered Proteins and Transcription." Arizona State University, October 25, 2017.
24. (invited PSU) Showalter, SA. "RNA Structure Drives RNA-dsRBD Interactions in miRNA Processing." Telluride Workshop on RNA Dynamics, Telluride, CO, July 24, 2017.
25. (invited PSU) Showalter, SA, "Punk Science: Candy Crazy" Pinhead Institute Punk Science Seminar Series, Telluride CO, July 18, 2017; Ridgway, CO, July 19, 2017.
26. (invited PSU) Showalter, SA. "Regulation of Eukaryotic Gene Expression by Intrinsically Disordered Proteins." Telluride Workshop on Intrinsically Disordered Proteins, Telluride, CO, July 14, 2017.
27. (invited PSU) Showalter, SA. "A Lack of Folding and yet a Function: Structural Insights into Intrinsically Disordered Proteins and Transcription." 2017 Middle Atlantic Regional Meeting of the American Chemical Society, Hershey, PA, June 5, 2017.
28. (Invited PSU) Showalter, SA. "A Lack of Folding and yet Function: Structural Insights into Intrinsically Disordered Proteins and Transcription." Skidmore College, Saratoga Springs, NY, March 1, 2017.

29. (Invited PSU) Showalter, SA. "Phosphorylation Induces Sequence-Specific Conformational Switches in the RNA Polymerase II C-Terminal Domain." Future of Biophysics Symposium, Biophysical Society 61st Annual Meeting, New Orleans, LA, February 13, 2017.
30. (Contributed PSU) Gibbs, EB, Showalter, SA. "Phosphorylation Induces Sequence-Specific Conformational Switches in the RNA Polymerase II C-Terminal Domain." 30th Gibbs Conference on Biothermodynamics, Carbondale, IL, September 26, 2016.
31. (Invited PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." 252nd ACS National Meeting, Philadelphia, PA, August 21, 2016.
32. (Invited PSU) Showalter, SA. "Phosphorylation Induces Sequence-Specific Conformational Switches in the RNA Polymerase II C-Terminal Domain." Telluride Workshop on Protein and Peptide Interactions in Cellular Environments, Telluride, CO, June 27, 2016.
33. (Invited PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." Symposium on Biomolecular Structure, Function, and Dynamics, Brown University, Providence, RI, May 1, 2016.
34. (Invited PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." Michigan State University, East Lansing, MI, November 19, 2015.
35. (Invited, PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." Upstate Structural Biology Symposium, Syracuse University, Syracuse, NY, October 20, 2015.
36. (Invited, PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." 12th New England Structure Symposium, University of Connecticut, Storrs, CT, October 10, 2015.
37. (Invited, PSU) Showalter, SA. "RNA Structure Recognition in the miRNA Processing Pathway." Telluride Workshop on RNA Dynamics, Telluride, CO, July 20, 2015.
38. (Invited, PSU) Showalter, SA. "Structural Biophysics of Intrinsically Disordered Proteins." Telluride Workshop on Intrinsically Disordered Proteins, Telluride, CO, July 16, 2015.
39. (Invited, PSU) Showalter, SA. "Assessing Intrinsically Disordered Protein Structure and Function." CHESS Users Meeting, Ithaca, NY, June 9, 2015.
40. (Invited, PSU) Showalter, SA. "RNA Structure Recognition in the miRNA Processing Pathway." Case Western Reserve University, Cleveland, OH, April 16, 2015.
41. (Invited, PSU) Showalter, SA. "Assessing Intrinsically Disordered Protein Structure and Function through Carbon Detected NMR." ASBMB National Meeting, Boston, MA, March 31, 2015.
42. (contributed, PSU) Acevedo, R, Showalter, SA. "Helical defects in microRNA influence protein binding by TAR RNA binding protein." Rustbelt RNA Meeting, Pittsburgh, PA, October 18, 2014.

43. (Invited, PSU) Showalter, SA. "NMR Assessment of IDP Structure." Telluride Workshop on Protein and Peptide Interactions in Cellular Environments, Telluride, CO, June 27, 2014.
44. (invited, PSU) Showalter, SA. "Intrinsically Disordered Proteins: Methods for Structure and Dynamics Studies." Rensselaer Polytechnic Institute, Troy, NY, June 13, 2014.
45. (invited, PSU) Showalter, SA. "Quantitative Biophysical Characterization of Intrinsically Disordered Proteins." Johns Hopkins University, Baltimore, MD, November 22, 2013.
46. (invited, PSU) Showalter, SA. "Carbon Detected NMR Methods Probe Folding-Upon-Binding of Intrinsically Disordered Proteins." Upstate New York NMR Symposium, Troy, NY, November 8, 2013.
47. (invited, PSU) Showalter, SA. "Recognition of Primary- and Pre-miRNA Structure by dsRNA Binding Domains." University of Connecticut Medical Center, Storrs, CT, October 22, 2013.
48. (invited, PSU) Showalter, SA. "New Opportunities in Biophysical Chemistry: Assessing Structure-Function Relationships in Natively Disordered Biomolecules." The Pennsylvania State University, University Park, PA, October 17, 2013.
49. (contributed, PSU) Acevedo, R, Showalter, SA. "Revisiting Thermodynamic Cooperativity in TRBP Interactions with Double-Stranded RNA." 27th Annual Gibbs Conference on Biothermodynamics, Carbondale, IL, October 7, 2013.
50. (contributed, PSU) Acevedo, R, Sahu, D, Orench-Rivera, N, Quarles, KA, Showalter, S.A. "Using Biophysical Techniques to Investigate Protein-RNA Interactions." SACNAS National Meeting, San Antonio, TX, October 4, 2013.
51. (invited, PSU) Showalter, SA. "Application of Carbon Detected NMR Methods to Biomolecules in Solution." Susquehanna Valley Local ACS Section, hosted by Bucknell University, Lewisburg, PA, September 11, 2013.
52. (invited, PSU) Showalter, SA. "Towards Atomic Resolution Structures of miRNA Precursors." Telluride Workshop on RNA Dynamics, Telluride, CO, July 23, 2013.
53. (invited, PSU) Showalter, SA. "Quantitative Biophysical Characterization of Intrinsically Disordered Proteins." GRC: Proteins, Holderness, NH, June 20, 2013.
54. (invited, PSU) Showalter, SA. "Recognition of Primary- and Pre-miRNA Structure by dsRNA Binding Domains." 245th ACS National Meeting, New Orleans, LA, April 7, 2013.
55. (invited, PSU) Showalter, SA. "Linkage Between Folding and Binding of Intrinsically Disordered Proteins." Department of Chemistry, Yale University, New Haven, CT, March 5, 2013.
56. (invited, PSU) Showalter, SA. "Linkage Between Folding and Binding of Intrinsically Disordered Proteins." Department of Chemistry and Biochemistry, University of Maryland, College Park, MD, February 26, 2013.

57. (invited, PSU) Showalter, SA. "Probing Folding-Up-Binding Events Involving Intrinsically Disordered Proteins." Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, February 7, 2013.
58. (invited, PSU) Showalter, SA. "Carbon Detected NMR Methods Probe Folding-Up-Binding of Intrinsically Disordered Proteins." New York Structural Biology Center, New York, NY, November 14, 2012.
59. (invited, PSU) Showalter, SA. "Application of Carbon Detected NMR Methods to Biomolecules in Solution." 51st Eastern Analytical Symposium, NMR New Investigator Award Session, Summerset, NJ, November 13, 2012.
60. (invited, PSU) Showalter, SA. "Carbon Detected NMR Methods Probe Folding-Up-Binding of Intrinsically Disordered Proteins." Washington University School of Medicine, Department of Biochemistry and Molecular Biophysics, St. Louis, MO, November 7, 2012.
61. (invited, PSU) Showalter, SA. "Combining ITC with Carbon Detected NMR Methods to Probe Folding-Up-Binding Events Involving Intrinsically Disordered Proteins." 26th Annual Gibbs Conference on Biothermodynamics, Carbondale, IL, September 23, 2012.
62. (invited, PSU) Showalter, SA. "Recognition of Primary- and Pre-MicroRNA Structure by dsRBDs." St. Louis University, Department of Chemistry, St. Louis, MO, September 21, 2012.
63. (invited, PSU) Showalter, SA. "Application of Carbon Detected NMR Methods to Biomolecules in Solution: The Case of Intrinsically Disordered Proteins." Environmental and Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA, August 14, 2012.
64. (contributed, PSU) Croom, TJ, Cordek, DG, Lim, P, Tackett, A, Diedrich, JK, Julian, RR, Raney, KD, Gallay, PA, Showalter, SA, Cameron, CE. "Hepatitis C virus nonstructural protein 5A is a two-domain protein." ASV 2012: 31st Annual Meeting, Madison, WI, July 2012.
65. (invited, PSU) Showalter, SA. "Carbon Detected NMR Methods Probe Folding-Up-Binding of Intrinsically Disordered Proteins." Telluride Workshop on Protein and Peptide Interactions in Cellular Environments, Telluride CO, June 29, 2012.
66. (invited, PSU) Showalter, SA. "Carbon detected NMR methods probe folding-upon-binding events involving intrinsically disordered proteins." ACS Mid-Atlantic Regional Meeting, Baltimore MD, June 13, 2012.
67. (contributed, PSU) Quarles, KA, Sahu, D, Forsyth, E, Wostenberg, C, Showalter, SA. "Biochemical Analysis of Primary miRNA Structure Reveals an Extensive Capacity to Deform Near the Drosha Cut Site." 17th Annual Meeting of the RNA Society, Ann Arbor MI, June 12, 2012.
68. (invited, PSU) Showalter, SA. "Carbon Detected NMR Methods Probe Folding-Up-Binding Events Involving Intrinsically Disordered Proteins." Symposium on Biomolecular Structure, Function, and Dynamics, St. Jude Children's Research Hospital, Memphis TN, April 28, 2012.

69. (invited, PSU) Showalter, SA. "A Physical Chemist's Perspective on Intrinsically Disordered Proteins." Department of Chemistry, Hood College, Frederick MD, February 9, 2012.
70. (invited, PSU) Showalter, SA. "Application of Carbon Detected NMR to the Study of Intrinsically Disordered Proteins." 50th Eastern Analytical Symposium, Somerset NJ, November 15, 2011.
71. (invited, PSU) Showalter, SA. "Carbon Detected NMR of Intrinsically Disordered Proteins." Department of Structural Biology, University of Pittsburgh Medical Center, Pittsburgh, PA, May 5, 2011.
72. (invited, PSU) Showalter, SA. "Towards a Molecular Mechanism for miRNA Processing." Telluride Workshop on RNA Dynamics, Telluride, CO, July 27th, 2011.
73. (invited, PSU) Showalter, SA. "Dynamic Origins of Differential RNA Binding by Double-Stranded RNA Binding Domains Involved in microRNA Processing." 242nd ACS National Meeting, Anaheim, CA, March 28th, 2011.
74. (invited, PSU) Showalter, SA. "Biophysical Studies of MicroRNA Maturation in the Microprocessor Complex." Department of Biochemistry and Molecular Biology, Hershey Medical Center, Hershey, PA, November 2, 2009.
75. (invited, PSU) Showalter, SA. "¹³C-Direct Detection Spectroscopy of Intrinsically Disordered Proteins." 11th Annual Upstate NY NMR Symposium, Buffalo, NY, October 13, 2009.

Oral Presentations prior to Penn State

76. (contributed) Showalter, SA., Brüschweiler, R. "Dynamic Control of Ligand Binding Modes of the p53-Binding Cleft in MDM2." GRC: Computational Aspects - Biomolecular NMR, II Ciocco, Italy, May 2008.
77. (invited) Showalter, SA, Brüschweiler, R. "Validation of MD Simulations using NMR as Benchmarks." FSU Workshop on Quantitative Biophysics, Tallahassee, FL, February, 2007.
78. (contributed) Showalter, SA, Hall, KB. "The Functional Role of Correlated Motions in RNA-Protein Interactions." FSU Structural Biology Seminar, Tallahassee, FL, September, 2005.