

Dr. Christopher D. Snow

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Education and Training

Postdoc. Chem.E. CALIFORNIA INSTITUTE OF TECHNOLOGY 2006-2011

Ph.D. Biophysics STANFORD UNIVERSITY 2001-2006

Sc.B. Chemistry MASSACHUSETTS INSTITUTE OF TECHNOLOGY 4.9/5.0 1997-2001

Research Experience

CURRENT RESEARCH OVERVIEW

- Engineering protein crystals for catalysis, guest structure determination, template-delimited growth of guest inorganic nanostructures, biosensors, therapeutic drug delivery, virus detection, DNA barcodes, RNA delivery
- Computation-guided design of self-assembling protein and nucleic acid systems.
- Enzyme engineering for enhanced olfaction

POSTDOCTORAL RESEARCH

- Cytochrome P450 structure determination & prediction with Prof. Frances Arnold 2006-2011
- Computational protein structure prediction
 - Cellulase enzyme library design

GRADUATE RESEARCH

- Protein folding via distributed computing with Prof. Vijay Pande 2001-2006
- RNA-antibiotic NMR with Prof. Joseph Puglisi 2002
- Simulated annealing fragment MC with Prof. Michael Levitt 2001

Awards and Honors

Nelson Family Faculty Excellence Award 2019

CSU Alumni Association Best Teacher Award 2019

George T. Abell Outstanding Early Career Faculty Award 2015

KAUST Postdoctoral Fellowship 2008-2011

Jane Coffin Childs Postdoctoral Fellowship 2006-2008

NSF Bioinformatics Postdoctoral Fellowship (declined) 2006

Protein Society Best Poster Awards 2004-2005

HHMI Predoctoral Fellowship 2001-2006

NSF Predoctoral Fellowship (declined) 2001

Phi Beta Kappa 2001

Outstanding Chemistry Research Achievement by a MIT Undergraduate 2001

Hypercube Computational Chemistry Award 2001

1. Absolute comparison of simulated and experimental protein-folding dynamics

CD. Snow, H. Nguyen, VS. Pande, M. Gruebele
Nature (2002) 420(6911), 102-6

568 Citations. Impact Factor 50.0

2. Simulation of folding of a small alpha-helical protein in atomistic detail using worldwide-distributed computing

B Zagrovic, CD. Snow, MR. Shirts, VS. Pande
J. Mol. Biol. (2002) 323(5), 927-37

237 Citations. Impact Factor 5.7

3. The Trp Cage: Folding Kinetics and Unfolded State Topology via Molecular Dynamics Simulations

CD. Snow, B. Zagrovic, VS. Pande
J. Am. Chem. Soc. (2002) 124(49), 14548-9

221 Citations. Impact Factor 15.4

4. Native-like Mean Structure in the Unfolded Ensemble of Small Proteins

B. Zagrovic, CD. Snow, S. Khaliq, MR. Shirts, VS. Pande
J. Mol. Biol. (2002) 323(1), 153-64

159 Citations. Impact Factor 5.7

5. Atomistic protein folding simulations on the submillisecond time scale using worldwide distributed computing

VS. Pande, I. Baker, J. Chapman, S. Elmer, SM. Larson, YM. Rhee, MR. Shirts, CD. Snow, EJ. Sorin, B. Zagrovic
Biopolymers (2002) 68(1): 91-109

252 Citations. Impact Factor 2.5

6. Surface Salt Bridges, Double-Mutant Cycles, and Protein Stability: an Experimental and Computational Analysis of the Interaction of the Asp 23 Side Chain with the N-Terminus of the N-Terminal Domain of the Ribosomal Protein L9

DL. Luisi, CD. Snow*, J. Lin, ZS. Hendsch, B. Tidor, DP. Raleigh.
Biochemistry (2003) 42(23), 7050-60

63 Citations. Impact Factor 3.2

7. Trp zipper folding kinetics by molecular dynamics and T-jump spectroscopy

CD. Snow, L. Qiu, D. Du, F. Gai, SJ. Hagen, VS. Pande
Proc. Natl. Acad. Sci. USA (2004) 101(12), 4077-82

177 Citations. Impact Factor 11.2

8. Using path sampling to build better Markovian state models: Predicting the folding rate and mechanism of a tryptophan zipper beta hairpin

N. Singhal, CD. Snow, VS. Pande
J. Chem. Phys. (2004) 121(1) 415-25

216 Citations. Impact Factor 3.5

9. How well can simulation predict kinetics and thermodynamics of protein folding?

CD. Snow, E. Sorin, YM. Rhee, VS. Pande
Annu. Rev. Biophys. and Biomol. Struct. (2005) 34, 43-69

202 Citations. Impact Factor 13.0

10. Direct calculation of the binding free energies of FKBP ligands

H. Fujitani, Y. Tanida, M. Ito, G. Jayachandran, CD. Snow, MR. Shirts, EJ. Sorin, VS. Pande
J. Chem. Phys., (2005) 123, 084108

158 Citations. Impact Factor 3.5

11. Dimerization of the p53 oligomerization domain: Identification of a folding nucleus by molecular dynamics simulations

LT. Chong, CD. Snow, YM. Rhee, VS. Pande
J. Mol. Biol. (2005) 345(4), 869-78

33 Citations. Impact Factor 5.7

12. Electric fields at the active site of an enzyme: direct comparison of experiment with theory

IT. Suydam, CD. Snow, VS. Pande, SG. Boxer
Science (2006) 313, 200-4

253 Citations. Impact Factor 47.7

13. Kinetic definition of protein folding transition state ensembles and reaction coordinates

CD. Snow, YM Rhee, Vijay S. Pande
Biophys. J. (2006) 91, 14-24

29 Citations. Impact Factor 4.0

14. Computer Simulations of Protein Folding

VS Pande, EJ Sorin, CD Snow, YM Rhee

Protein Folding, Misfolding and Aggregation: Classical Themes and Novel Approaches. Royal Society of Chemistry: Cambridge (2008) Chapter 8

1 Citation

15. A diverse family of thermostable cytochrome P450s created by recombination of stabilizing fragments

Y. Li, DA. Drummond, AM. Sawayama, CD. Snow, JD. Bloom, FH. Arnold

Nature Biotechnology (2007) 25(9), 1051-6

107 Citations. Impact Factor 54.9

16. Hunting for predictive computational drug-discovery modelsCD. Snow. *Expert Reviews in Anti-Infective Therapy* (2008) 6(3), 291-3

1 Citations. Impact Factor 3.8

17. Evolutionary History of a Specialized P450 Propane Monooxygenase

R. Fasan, Y. Meharena, CD. Snow, T. Poulos, FH. Arnold

J. Mol. Biol. (2008) 383(5), 1069-80

148 Citations. Impact Factor 5.7

18. Side-chain recognition and gating in the ribosome exit tunnel

P. Petrone, CD. Snow, D. Lucent, VS. Pande

Proc. Natl. Acad. Sci. USA (2008) 105(43), 16549-54

64 Citations. Impact Factor 11.2

19. A Family of Thermostable Fungal Cellulases Created by Structure-Guided Recombination

P. Heinzelman, CD. Snow, I. Wu, C. Nguyen, A. Villalobos, S. Govindarajan, J. Minshull, FH.

Arnold

Proc. Natl. Acad. Sci. USA (2009) 106(14), 5610-15

186 Citations. Impact Factor 11.2

20. SCHEMA Recombination of a Fungal Cellulase Uncovers a Single Mutation that Contributes Markedly to Stability

P. Heinzelman, CD. Snow, MA. Smith, X. Yu, A. Kannan, A. Villalobos, S. Govindarajan, J.

Minshull, Frances H. Arnold. *J. Biol. Chem.* (2009) 284(39), 26229-33

91 Citations. Impact Factor 5.2

21. SHARPEN: Systematic Hierarchical Algorithms for Rotamers and Proteins on an Expansive Network

IV Loksha*, J Maiolo, C. Hong*, A. Ng*, CD. Snow

J Comp Chem (2009) 30(6), 999-1005

12 Citations. Impact Factor 3.4

22. Efficient Screening of Fungal Cellobiohydrolase Class I Enzymes for Thermostabilizing Sequence Blocks by SCHEMA Structure-Guided Recombination

P. Heinzelman, R. Komor, A. Kannan, PA. Romero, L. Yu, S. Mohler, CD. Snow, FH. Arnold

Protein Eng. Des. Sel. (2010) 23(11): 871-80

75 Citations. Impact Factor 1.8

23. Combinatorial Alanine Substitution Enables Rapid Optimization of Cytochrome P450BM3 for Selective Hydroxylation of Large Substrates

JC. Lewis, SM. Mantovani, Y. Fu, CD. Snow, RS. Komor, CH. Wong, FH. Arnold

Chem. Bio. Chem. (2010) 11(18): 2502-5

72 Citations. Impact Factor 3.2

24. Non-bulk-like Solvent Behavior in the Ribosome Exit Tunnel

D. Lucent, CD. Snow, C. Aitken, SE. Lee, VS. Pande.

PLoS Comput. Biol. (2010) 6(10): e1000963

32 Citations. Impact Factor 4.4

25. Engineered Ketol-acid Reductoisomerase and Alcohol Dehydrogenase Enable Anaerobic 2-methylpropan-1-ol production at Theoretical Yield in Escherichia coli

S. Bastian, X. Liu, JT. Meyerowitz, CD Snow, MM. Chen, FH. Arnold

Metab. Eng. (2011) 13(3): 345-52

197 Citations. Impact Factor 7.8

26. Engineered Bacterial Mimics of Human Drug Metabolizing Enzyme CYP2C9

A. Rentmeister, TR. Brown, CD Snow, MN. Carbone, FH. Arnold

Chem. Cat. Chem. (2011) 3(6): 1065-71

30 Citations. Impact Factor 5.7

27. Polarizable Protein Repacking

AH. Ng* & CD. Snow

J. Comp. Chem (2011) 32(7): 1334-44

4 Citation. Impact Factor 3.4

28. Comparison of Random Mutagenesis and Semi-Rational Designed Libraries for Improved Cytochrome P450 BM3-catalyzed Hydroxylation of Small Alkanes

MM Chen, CD Snow, CL Vizcarra, SL Mayo, FH Arnold

Prot. Engr. Des. Sel. (2012) 25(4): 171-8

64 Citations. Impact Factor 1.8

29. A Diverse Set of Family 48 Bacterial Cellulases Created by Structure-Guided Recombination

M Smith, A Rentmeister, CD Snow, T Wi, M Farrow, F Mingardon, FH Arnold

FEBS Journal. (2012) 279(24): 4453-65

30 Citations. Impact Factor 5.5

30. Structure-Guided Directed Evolution of Highly Selective p450-based Magnetic Resonance Imaging Sensors for Dopamine and Serotonin

EM Brustad, VS Lelyveld, CD Snow, N Crook, ST Jung, FM Martines, TJ Scholl, A Jasanoff, FH Arnold

J. Mol. Biol. (2012) 422(2): 245-62

30 Citations. Impact Factor 5.7

31. Structure-guided Engineering of Lactococcus lactis Alcohol Dehydrogenase LIAdhA for Improved Conversion of Isobutyraldehyde to Isobutanol

X Liu, S Bastian, CD Snow, EM Brustad, TE Saleski, JH Xu, P Meinhold, FH Arnold

J Biotechnol. (2012) 164(2): 188-95

27 Citations. Impact Factor 3.2

32. General approach to reversing ketol-acid reductoisomerase cofactor dependence from NADPH to NADH

S Brinkmann-Chen, T Flock, JK Cahn, CD Snow, EM Brustad, JA McIntosh, P Meinhold, L Zhang, FH Arnold

Proc. Natl. Acad. Sci. USA (2013) 110(27): 10946-51

70 Citations. Impact Factor 11.2

33. Methods for Library-Scale Computational Protein Design

L Johnson, T Huber, CD Snow

Methods in Molecular Biology: Protein Design. Springer. (2014) 1216:129-59

4 Citations

34. Characterization of the Target of Ivermectin, the Glutamate-gated Chloride Channel, from *Anopheles gambiae*

Jl. Meyers, M. Gray, W. Kuklinski, LB. Johnson, CD Snow, WC. Black IV, KM. Partin, BD. Foy.

J. Experimental Biology. (2015) 218:1478-86.

40 Citations. Impact Factor 3.3

35. Discriminating between stabilizing and destabilizing protein design mutations via recombination and simulation

LB Johnson, LP Gintner*, S Park**, CD Snow.

Prot. Engr. Des. Sel. (2015) 28(8):259-67

9 Citations. Impact Factor 1.8

36. Conservative and compensatory evolution in oxidative phosphorylation complexes of angiosperms with highly divergent rates of mitochondrial genome evolution

J Havird, N Whitehill, CD Snow, D Sloan

Evolution. (2015) 69(12):3069-81 DOI: 10.1111/evo.12808.

35 Citations. Impact Factor 3.7

37. A Structure Based Design Protocol for Optimizing Combinatorial Protein Libraries

MW Lunt, CD Snow

Methods in Molecular Biology: Protein Design. Springer (2016) Springer. 1414:99-138

3 Citations

38. Gold Nanoparticle Capture Within Protein Crystal Scaffolds

AE Kowalski, TR Huber, TW Ni, LF Hartje, KL Appel*, JW Yost*, CJ Ackerson CD Snow

Nanoscale. (2016), 8(25):12693-6. DOI:10.1039/c6nr03096c.

19 Citations. Impact Factor 7.8

39. Molecular Dynamics Simulations of Cellulase Homologues in Aqueous 1-ethyl-3-methylimidazolium Chloride

LB Johnson, CD Snow

J. Biomol. Struct. Dyn. (2016) DOI:10.1080/07391102.2016.1204364

8 Citations. Impact Factor 3.4

40. Optimizing Shape Complementarity Scoring Parameters for Recognition of Authentic Crystal Packing Arrangements

JA Bennett*, CD Snow

J. Crystal Growth & Design. (2016) 16(9):5579-83. 10.1080/07391102.2016.1204364 Impact Factor 4.1**41. Characterization of Supercharged Cellulase Activity and Stability in Ionic Liquids**

LB Johnson, S Park**, LP Gintner*, CD Snow

J. Mol. Catalysis B. (2016). 132: 84-90. 10.1016/j.molcatb.2016.05.008 12 Citations. Impact Factor 2.3**42. Programmed Assembly of Host-Guest Protein Crystals**

TR Huber, LF Hartje, EC McPherson*, AE Kowalski, CD Snow

Small. (2016) 13(7). 10.1002/smll.201602703

16 Citations. Impact Factor 13.3

43. An Evolved Orthogonal Enzyme/Cofactor Pair

E Reynolds, M McHenry, F Cannac, CD Snow, EM Brustad

J. Am. Chem. Soc. (2016) 138(38):12451-8. 10.1021/jacs.6b05847

25 Citations. Impact Factor 15.4

44. Adsorption-Coupled Diffusion of Gold Nanoclusters within a Large-Pore Protein Crystal Scaffold.

LF Hartje, B Munsky, TW Ni, CJ Ackerson, CD Snow

J. Phys. Chem. B. (2017) 121(32):7652-9. 10.1021/acs.jpccb.7b03999

9 Citations. Impact Factor 3.0

45. Installing Guest Molecules at Specific Sites within Scaffold Protein Crystals

TR Huber, EC McPherson*, CE Keating*, CD Snow

Bioconjug. Chem. (2018) 29(1):17-22. 10.1021/acs.bioconjchem.7b00668

11 Citations. Imp.Fac. 4.8

46. Characterizing the Cytocompatibility of Various Cross-Linking Chemistries for the Production of Biostable Large-Pore Protein Crystal Materials

LF Hartje, HT Bui, DA Andales*, SP James, TR Huber, CD Snow

ACS Biomater. Sci. & Eng. (2018) 4(3):826-31. 10.1021/acsbiomaterials.8b00023

10 Cit. Imp.Fac. 4.7

47. Synthesis of Luminescent Lanthanide Complexes within Crosslinked Protein Crystal Matrices

Y Zhang, X Zhang, J Tang, CD Snow, G Sun, AE Kowalski, LF Hartje, N Zhao, Y Wang, L Belfiore

Cryst. Eng. Comm. (2018) 20:2267-77.

4 Citations. Impact Factor 3.5

48. Porous Protein Crystals as Scaffolds for Enzyme Immobilization

AE Kowalski, LB Johnson, H Dierl*, S Park*, TR Huber, CD Snow

Biomaterials Science (2018) 7, 1898

19 Citations. Impact Factor 6.8

49. Enhancing the Power Conversion Efficiency for Polymer Solar Cells by Incorporating Luminescent Nanosolid Micelles as Light Converters

D Wang, W Shen, J Tang, Y Wang, J Liu, X Wang, R Yang, CD Snow, L Huang, J Jiao, Y Wang, W Wang, LA Belfiore.

ACS Appl. Energy Mater. (2018) 1(4):1445-1454

3 Citations. Impact Factor 6.0

50. Protein Crystal Based Materials for Nanoscale Applications in Medicine and Biotechnology

LF Hartje, CD Snow

WIREs Nanomedicine and Nanobiotechnology. (2018) 10.1002/wnan.1547

10 Cit. Impact Factor 9.4

51. Advancing Biomarkers for Anaerobic O-xylene Biodegradation via Metagenomic Analysis of a Methanogenic Consortium

K Rossmassler, CD Snow, B Taggart, C Brown, SK De Long.

Appl. Microbiol. & Biotech. (2019) 103(10):4177-4192

3 Citations. Impact Factor 3.5

52. Drug Sensing of Protein Crystals Doped with Luminescent Lanthanide Complexes

Sun G, Tang J, Snow CD, Li Z, Zhang Y, Wang Y, Belfiore LA

Crystal Growth and Design (2019) 19(10): 5658-5664. 10.1021/acs/cgd.9b00642

6 Cit. Imp.Fac. 4.1

53. Porous crystals as scaffolds for structural biology

Ward A, Snow CD

Current Opinion in Structural Biology (2020) 60: 85-92

9 Citations. Impact Factor 6.8

54. Near infrared emitting and biocompatible Yb³⁺-DNA complexes with dual responses to Cu²⁺ and Fe³⁺.

Li Z, Sun G, Snow CD, Xu Y, Wang Y, Xiu D, Zhang U, Zhu Z, Belfiore LA, Tang J.

Optical Materials (2020) 108: 110157 10.1016/j.optmat.2020.110157

2 Citations. Impact Factor 3.1

55. Design of genetically-encoded sensors to detect nucleosome ubiquitination in live cells.

Passos CDS, Choi Y-S, Snow CD, Cohen RE, Yao T.

Journal of Cell Biology (2021) 220(4).

2 Citations. Impact Factor 10.5

56. Histidine polypeptide-hybridized nanoscale metal-organic framework to sense drug loading/release.

Yanan X, Zhenhua L, Xiu D, Sun G, Snow CD, Wang Y, Wang Y, Belfiore LA, Tang J.

Materials & Design (2021) 205: 109741.

1 Citations. Impact Factor 8.0

57. Measuring interactions of DNA with nanoporous protein crystals by atomic force microscopy.

Wang D, Stuart JD, Jones AA, Snow CD, Kipper MJ.

Nanoscale (2021) 13(24): 10871

Impact Factor 7.8

58. Stable Fluorescence of Eu³⁺ Complex Nanostructures Beneath a Protein Skin for Potential Biometric Recognition

Zhao Y, Yao Z, Snow CD, Xu Y, Wang Y, Xiu D, Belfiore LA, Tang J.

Nanomaterials (2021) 11(9): 2462

Impact Factor 4.9

59. Stabilizing DNA-Protein Co-Crystals via Intra-Crystal Chemical Ligation of the DNA

Ward AR, Dmytriw S, Vajapayajula A, Snow CD.

Crystals (2021) 12(1): 49

Impact Factor 2.6

60. Conditionally designed luminescent DNA crystals doped by Ln³⁺(Eu³⁺/Tb³⁺) complexes or fluorescent proteins with smart drug sensing property

Xiu D, Zhao S, Li Z, Xu Y, Wang Y, Zhe Z, Zhang M, Snow CD, Belfiore LA, Tang J.

J Materials Chem. B (2022) Advance article

Impact Factor 6.3

61. Lanthanide (Eu³⁺/Tb³⁺)-loaded γ -cyclodextrin nano-aggregates for smart sensing of the anticancer drug of irinotecan.

Guo Y, Liu J, Tang Q, Li C, Zhang Y, Wang Y, Wang Y, Bi Y, Snow CD, Kipper MK, Belfiore LA, Tang J.

Int. J. Mol. Sci. (2022) 23(12) 6597

Impact Factor 6.2

62. Mosquito Tagging Using DNA-Barcoded Nanoporous Protein Crystals

JD Stuart, DA Hartman, LI Gray, AA Jones, NR Wickenkamp, C Hirt, A Safira, AR Regas, TM

Kondash, ML Yates, S Driga, CD Snow, RC Kading.

PNAS Nexus (2022)

Impact Factor TBD

63. Scalable Combinatorial Assembly of Synthetic DNA for Tracking Applications

JD Stuart, NR Wickenkamp, KA Davis, C Meyer, RC Kading, CD Snow

Int. J. Mol. Sci (2023)

Impact Factor 6.2

64. Textile Functionalization by Porous Protein Crystal Conjugation and Guest Molecule Loading

LF Hartje, DA Andales, LP Gintner*, LB Johnson, YV Li, CD Snow

Crystals (2023)

Impact Factor 2.7

65. Ligand Presentation Inside Protein Crystal Nanopores: Tunable Interfacial Adhesion Noncovalently Modulates Cell Attachment

D Wang, M Hedayati, JD Stuart, LYC Madruga, KC Popat, CD Snow, MP Kipper
Materials Today Nano (2023) 24, 100432 Impact Factor 10.3

66. Modular Protein-DNA Co-Crystals as Precise Programmable Assembly Scaffolds
AR Orun, ET Shields, S Dmytriw, A Vajapayajula, CK Slaughter, CD Snow
ACS Nano (2023) 17(14), 13110-13120 Impact Factor 17.1

67. Improved performance for polymer solar cells through photon energy harvesting and down-conversion of Eu³⁺-induced deblock polymer aggregates (EIPAs)
Z Long, S Li, W Shen T Li, Wang Y, S Guo, Kipper MK, Snow CD, Belfiore LA, Tang J.
J. Mater. Chem. C. (2023) 11 12730-12739. Impact Factor 6.4

68. DNA Hybrid Fluorescent Chrominance Sensor: Drug Sensing Through Direct Gradient Fluorescent Color Transformation of Hybrid DNA Crystals Loaded Lanthanide (Eu³⁺/Tb³⁺) Complexes
Zhao S, Xiu D, Zhang M, Wang Y, Qiu M, Snow CD, Wang Y, Belfiore LA, Tang J.
J. Cryst. Growth. (2024) 630(15) 127582 Impact Factor 1.8

69. Laboratory Evolution of Substrate Recognition and Nanoparticle Product Size
A Hendricks, R Cohen, G McEwen, T Tien, B Guilliams, A Alspach, CD Snow, C Ackerson
ACS Chemical Biology (2024) in print Impact Factor 4.0

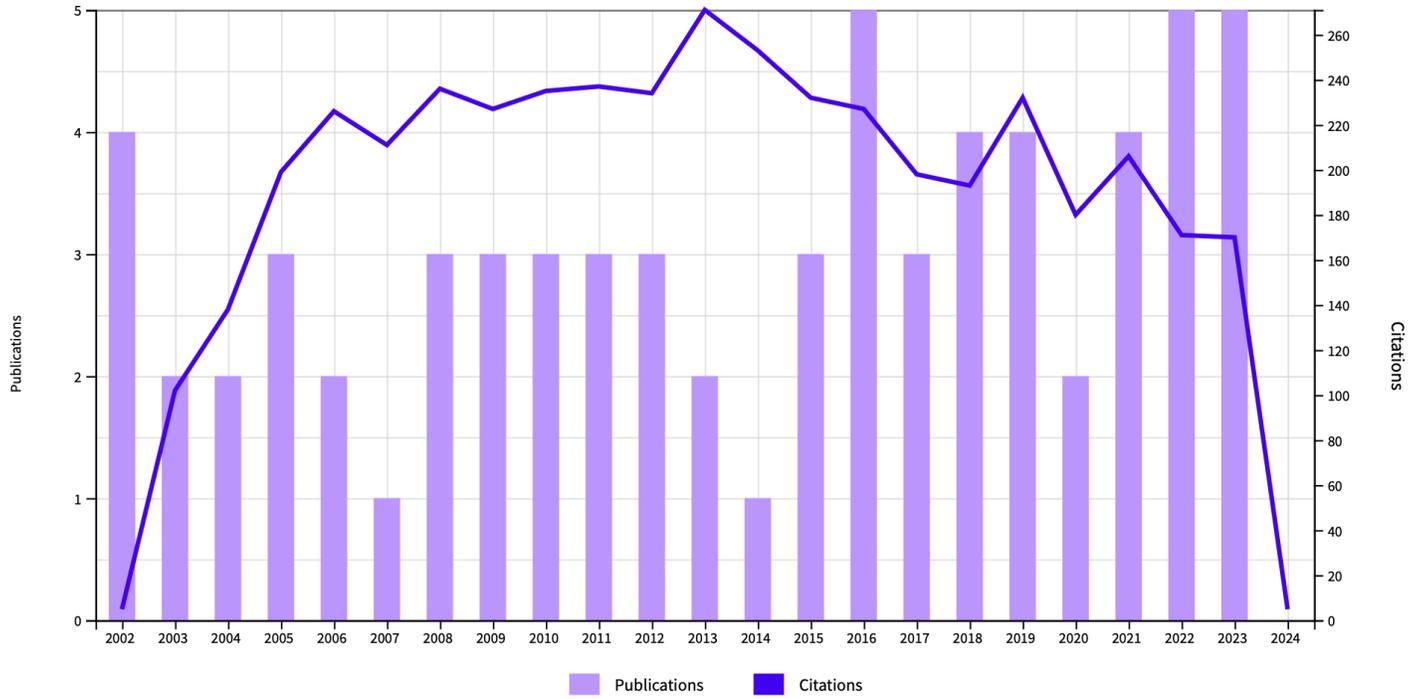
70. Porous Protein Crystals: Synthesis and Applications
AA Jones, CD Snow
Chem Comm. (2024) *submitted invited review* Impact Factor 6.2

71. Automation of Protein Crystallization Scaleup via OpenTrons-2 Liquid Handling
J DeRoo, CD Snow
SLAS Technology. (2024) *submitted* Impact Factor 2.8

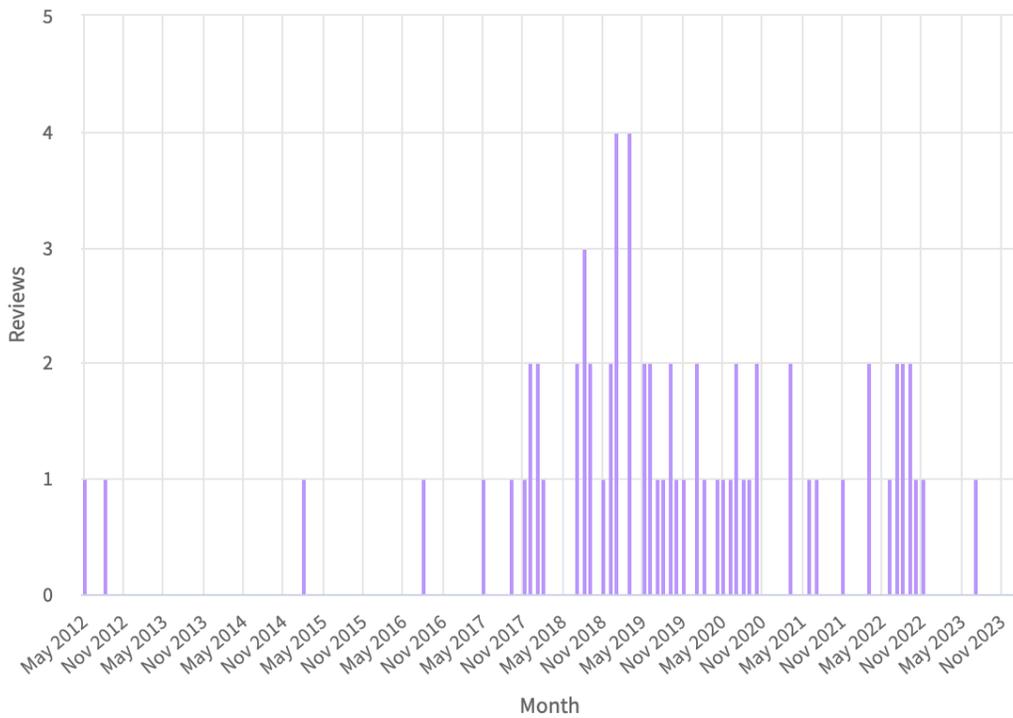
72. Protein Crystals as Molds for Seeded Gold Nanorod Growth
AE Kowalski, R Nemeth, S Zintgraff*, S Sloan*, TR Huber, P Ciesielski, CJ Ackerson, CD Snow
Preparing for (re)submission

Key: *Undergraduate author, **Pre-collegiate author

Citation Summary (ResearcherID Report: L-5624-2013)



Reviews



Selected Conference Abstracts & Poster Presentations

1. Elucidating the role of electrostatic interactions in protein folding and stability: A combined experimental and computational approach.

DP Raleigh, JH Cho, ZS Hendsch, JC Horng, B Kuhlman, DL Luisi, V Moroz, S Sato, CD Snow, B Tidor. *American Chemical Society*. (2002).

2. Directly calculated ligand binding free energies using Folding@Home.

MR Shirts, G Jayachandran, CD Snow, et al. *National Meeting of the American Chemical Society*. Philadelphia (2004)

3. Directly calculated ligand binding free energies using Folding@Home.

MR Shirts, CD Snow, VS Pande. *National Meeting of the American Chemical Society*. Anaheim. (2004)

4. Exploring the kinetics and mechanism of millisecond protein folding with molecular dynamics.

CD Snow, VS Pande. *18th Symp. of the Protein Society*. San Diego. (2004).

5. Unfolding and refolding the p53 oligomerization domain dimer: molecular dynamics

studies in explicit water. LT Chong, CD Snow, Y Rhee et al. *18th Symp. of the Protein Society*. San Diego. 2004.

6. Binding energy calculation for FKBP receptor and ligands by generalized bar method.

H Fujitani, Y Tanida, M Ito et al. *National Meeting of the American Chemical Society*. Mar 13-17. San Diego. (2005)

7. Direct calculation of absolute free energies of ligand binding without knowledge of the bound state.

MR Shirts, G Jayachandran, H Fujitani, et al. *National Meeting of the American Chemical Society*. San Diego. 2005.

8. Binding energy calculation for theophylline-RNA aptamer with generalized bar method.

Y Tanida, M Ito, H Fujitani, et al. *National Meeting of the American Chemical Society*. San Diego. 2005.

9. Quantifying the conformational space of FKBP ligand binding.

MR Shirts, CD Snow, G Jayachandran et al. *National Meeting of the American Chemical Society*. 2006.

10. Explicit and implicit solvation binding free energies of FKBP-12.

MR Shirts, G Jayachandran, CD Snow et al. *National Meeting of the American Chemical Society*. 2007.

11. SCHEMA recombination reveals structural characteristics of active variants of *Hypocrea jecorina* Cel5a.

M Farrow, TM Lee, CD Snow et al. *National Meeting of the American Chemical Society*. Denver. 2011

12. SCHEMA structure-guided recombination in engineering cellulase families for biomass-to-biofuel conversion processes

P Heinzelman, CD Snow, R Komor, I Wu, M Smith, P Romero, FH Arnold. *National Meeting of the American Chemical Society*. Anaheim. 2011.

13. Focused library design via combinatorial optimization of degenerate codons.

CD Snow. *National Meeting of the American Chemical Society*. Anaheim. 2011.

14. High-Resolution Models from Low Resolution Data: Recombination of Fragments for Crystallographic Structure Determination.

CD Snow. *26th Symp. of the Protein Society*. San Diego (2012)

15. GPU-accelerated algorithms for sampling protein crystal forms.

CD Snow. *27th Symposium of the Protein Society*. Boston (2013)

16. Dissecting Contributions to Protein Stability Via Recombination of a Wild Type and Computationally Designed Protein.

L Johnson, L Gintner, L Minardi, CD Snow. *28th Symp. of the Protein Society*. San Diego (2014)

17. Beyond Glutaraldehyde: The Search for Optimal Chemical Crosslinkers for Protein Crystals

TR Huber, J Sebesta, CD Snow. *28th Symp. of the Protein Society*. San Diego (2014)

18. Library-scale evaluation of a computational design and thermostable cellulase.

LB Johnson (oral presenter), LP Gintner*, S Park**, CD Snow. *249th ACS National Meeting*. Denver (2015)

19. Engineering Porous Protein Crystals as Scaffolds for Programmed Assembly

TR Huber, LF Hartje, CD Snow. *29th Symp. of the Protein Society*. Barcelona (2015)

20. Engineering Porous Protein Crystals as Scaffolds for Programmed Assembly

TR Huber, LF Hartje, AE Kowalksi, LB Johnson, JC Sebesta, CD Snow. *30th Symp. of the Protein Society*. Baltimore (2016)

21. Engineering Porous Protein Crystals as Scaffolds for Programmed Assembly

TR Huber, LF Hartje, AE Kowalksi, LB Johnson, JC Sebesta, CD Snow. *Gordon Research Conference: Bioinspired Materials*. Les Diablerets, Switzerland (2016)

22. Synthesis of Nanostructures Inside Crystalline Protein Scaffolds.

CD Snow. NSF Nanoscale Science and Engineering Grantees Conference. Arlington (2016)

23. Characterizing Large-Pore Protein Crystals for Advanced Material Applications

LF Hartje, BE Munsky, HT Bui, DA Andales, CD Snow. *62nd Annual Meeting of the Biophysical Society* (2018)

24. Synthetic Biology and the Nasal Microbiome

CD Snow, CAM Peebles. *1st Annual Meeting Front Range Microbiome Symposium*. Fort Collins (2019)

25. Textile functionalization by porous protein crystal conjugation and guest molecule loading

LF Hartje, D Andales, L Gintner, L Johnson, L Yan, CD Snow. *257th ACS National Meeting*. Orlando (2019).

26. Modular and Expandable Protein-DNA Co-crystal Scaffolds to Assist in X-ray Diffraction of DNA-Binding Macromolecules

A Ward, CD Snow. *33rd Symp. of the Protein Society*. (2019)

27. Modular and Expandable Protein-DNA Co-crystal Scaffolds to Assist in X-ray Diffraction of DNA-Binding Molecules

A Ward, E Shields, S Dmytriw, A Vajapayajula, CD Snow. *35th Symp. of the Protein Society*. (2021)

28. Chemical DNA ligation templated by a DNA-binding protein scaffold

S Dmytriw, A Vajapayajula, A Ward, CD Snow. *35th Symp. of the Protein Society*. (2021)

29. Development of porous protein nanocrystals as a delivery vector for DNA and RNA

A Jones, M Masri, CD Snow. *35th Symp. of the Protein Society*. (2021)

30. Quantifying Protective Effects of Engineered Porous Protein Crystals on Adsorbed Guest RNA

M Masri, CD Snow, A Jones. *35th Symp. of the Protein Society*. (2021)

31. Porous Protein Crystal Scaffolds for Peroxidase Pixel Detectors

L Beatty, A Jones, CD Snow. *35th Symp. of the Protein Society*. (2021)

32. Measuring Interactions of Polymers with Porous Protein Crystals by Atomic Force Microscopy and Tuning Cell Responses via Ligand Presentation

D Wang, M Hedayati, JD Stuart, KC Popat, CD Snow, MJ Kipper. *BMES* (2022)

33. Development of porous protein nanocrystals as a delivery vector for DNA and RNA

A Jones, M Masri, CD Snow. *36th Symp. of the Protein Society*. (2022) **Poster Award**

34. Engineering a protein crystal scaffold for modular installation of enzymes

B Kelly*, L Beatty*, A Jones, CD Snow. *36th Symp. of the Protein Society*. (2022)

35. Computational Optimization of a FLAG-binding Single-Chain Variable Fragment

J De Roo, CD Snow. *36th Symp. of the Protein Society*. (2022) **Selected for Flash Talk**

36. In Silico Prediction of Linear Antibody-Epitopes via AlphaFold2

J DeRoo, ST James, CD Snow, B Geiss 37th Symp. of the Protein Society. (2023) Poster Award

37. Stabilization of the Protein-Protein Interface in Protein-DNA Co-Crystals

C Shepherd*, E Shields, C Slaughter, CD Snow. 37th Symp. of the Prot. Soc. (2023) Poster Award

38. Wastewater viral surveillance using modified porous protein microcrystals

A Jones, B Kelly*, T Ahr, CD Snow. 37th Symp. of the Protein Society. (2023)

39. Adsorption of DNA-Binding Proteins via Engineered Host DNA Crystals

C Slaughter, CD Snow. 37th Symp. of the Protein Society. (2023)

40. Optimizing Protein Crystal Stability Using a Network of Disulfide Bonds

A O'Brian*, CD Snow. 37th Symp. of the Protein Society. (2023)

41. Improved Protein Crystal Production via Microfluidic Flow Cells

T Ahr*, CD Snow. 37th Symp. of the Protein Society. (2023)

42. Expanded Co-Crystals as Scaffolds for DNA-binding Protein Guests

E Shields, CD Snow. 37th Symp. of the Protein Society. (2023)

ACS Cole thing, prob ICC.

43. **Wastewater screening**

A Jones, XXXXXXXX, CD Snow. J Mizia, XXXXXX CSU Hydrology Days. (2024)

PATENTS

U.S. Provisional Patent Application No. 62/128,384, "Optimized E1 Endoglucanase Sequence" assigned to CSURF.

U.S. Provisional Patent Application No. 62/748,213, "Isorecticular Co-Crystals" assigned to CSURF.

U.S. Provisional Patent Application No. 63/111,927, "Crosslinked Porous Protein Crystals with Guest Barcode DNA", assigned to CSURF

United States Patent Application 20230399637. "CROSSLINKED POROUS PROTEIN CRYSTALS WITH GUEST BARCODE DNA"

U.S. Patent 10590176. "Engineering Programmable Molecular Scaffolds from Porous Protein Crystals" assigned to Colorado State University Research Foundation

GRANT SUPPORT

Validating Computational Design Principles for Crystalline Enzyme Assemblies.

American Chemical Society: Petroleum Research Fund. 52404-DNI10. \$100,000 direct
9-1-2012 – 8-31-2014. Snow (PI)

SBIR Phase II: Real-Time Biosensor for Measuring Hazardous Chemical Contaminants in Ground Water

National Science Foundation IIP 1431003 Subcontract \$28,971
8-1-2014 – 7-31-2016. PI for subcontract

Highly Parallel Synthesis of Nanostructures Inside Crystalline Protein Scaffolds

National Science Foundation. CMMI 1434786 \$350,000
9-1-2014 – 8-31-2017. Snow (PI)

Programmed Assembly of Conductive Protein Crystals

<i>National Science Foundation.</i> 9-1-2015 – 8-31-2018.	DMR 1506219 Snow (PI)	\$357,437
EAGER: Coherent Guest Protein Organization Inside Host Protein Crystals <i>National Science Foundation.</i> 9-1-2016 – 2-28-2018.	CHEM CMI 1645015 Snow (PI)	\$100,000
Tuning Interfacial Biomolecule Interactions with Massively Parallel Nanopore Arrays <i>National Science Foundation.</i> 7-15-2017 – 6-30-2020.	CBET BEINM, Snow (Co-PI)	\$439,341
Innovative Platforms for In Vivo Molecular Tagging and Editing <i>Colorado State University</i> 1-1-2018 – 12-31-2019	OVPR Snow (PI)	\$200,000
Innovative Platforms for In Vivo Molecular Tagging and Editing <i>Colorado State Advanced Industries</i> 1-1-2018 – 12-31-2018	OEDIT POC Snow (PI)	\$106,666
Assessing Arthropod Labeling and Transmission of Protein Crystals Containing DNA Barcodes Optimized for Next-Generation Sequencing <i>Colorado Clinical and Translational Sciences Institute</i> 4-1-2019 – 4-30-2021	Kading (PI), Snow (Co-I)	\$28,584
Development of a Platform to deliver RNA <i>US Dep. of Agriculture / Nat. Wildlife Res. Center</i> 9-30-2018 – 9-29-2022	APP-7694 Snow (PI)	\$300,000
Nasal Microbiome Engineering for Enhanced Olfaction <i>DOD, Office of Naval Research</i> 3-1-2019 – 9-30-2022	GRANT12762737 Snow (PI), Peebles (Co-I)	\$749,898
STTR Phase I: Enzyme design for economical feed additives from sugar <i>National Science Foundation</i> 7-1-2019 – 6-30-2020	STTR 1914098 / Sasya LLC Vemuri (PI), Snow (subcontract PI)	\$225,000
Surveillance of mosquito and arbovirus dispersal using smart microcrystals <i>National Institutes of Health</i> 7-1-2019 – 6/30/2021	NIH NIAID R21AI146740 Kading (PI), Snow (Co-I)	\$404,532
Nelson Family Faculty Excellence Award <i>CSU College of Engineering</i> 09/01/2019 – 8/31/2022	Snow (PI)	\$60,000
Integrating barcoded microcrystal technology with ongoing West Nile virus surveillance <i>CSU College Research Council</i> 10/2021 – 09/2022	Kading (PI), Snow (Co-PI)	\$24,998
Tracking mosquito movements from birth to bite <i>CSU One Health Institute</i>		\$3,148

05/2021 – 08/2021

(PI: VandeWoude)

Starting in 2015, I began to collaborate with and visit Dr. Jianguo Tang at Qingdao University. He has obtained several PRC grants to supported visits from foreign experts, provide a per diem during visits, and otherwise support foreign expert advising of Qingdao University graduate students.

Research on key technologies for biological and energy applications of natural polysaccharide hybrid materials

State Administration of Foreign Experts Affairs, PRC RMB 180,000
1-1-2017 to 12-31-2017 Tang (PI), Snow (one visiting expert)

Research on the key technology and the bio-energy application of high-efficiency luminescent hybrid bio-molecular materials

State Administration of Foreign Experts Affairs, PRC RMB 240,000
1-1-2018 to 12-31-2018 Tang (PI), Snow (one visiting expert)

Research on the key technology and the bio-energy application of high-efficiency luminescent hybrid bio-molecular materials

Shandong Administration of Foreign Experts Affairs, PRC RMB 200,000
1-1-2019 to 12-31-2019 Tang (PI), Snow (one visiting expert & sabbatical guest)

Research on the key technology and the bio-energy application of high-efficiency luminescent hybrid bio-molecular materials

State Administration of Foreign Experts Affairs, PRC pending
1-1-2020 to 12-31-2020 Tang (PI), Snow (consulting foreign expert)

生物大分子组装高效发光材料的研发. ~**Development of high-efficiency luminescent materials from biomacromolecule assemblies**

PRC Ministry of Science and Technology MOST 2017YFE0108300 RMB 1,000,000
1-1-2018 to 12-31-2020 Tang (PI), Snow (one visiting expert & sabbatical guest)

Clonable Nanoparticles

National Institutes of Health NIH NIGMS R01 GM137139 \$1,183,632
4-1-2020 to 3-31-2024 Ackerson (PI), Snow (Co-I)

Designed Expanded Co-Crystals for Guest Structure Determination

National Science Foundation NSF DMR BMAT 2003748 \$422,890
09/01/2020 – 08/31/2023 Snow (PI)

Scott Bioengineering Systems and Synthetic Biology (SSB) Pod Molecular Biology Expansion

Colorado State University OVPR \$25,000
2-1-2021 to 6-30-2021 Snow (Co-PI)

MURALS First Year Scholar Pilot Program

Colorado State University Office of the Provost \$2,000
8-1-2021 to 12-31-2021 Snow (PI)

Multiplexed imaging of viral protein processing and assembly in live cells

National Institutes of Health NIH NIAID R56 AI155897-01A1 \$517,692
8-6-2021 to 7-31-2022 Snow (PI), Stasevich (PI), Geiss (Co-I)

Multiplexed imaging of viral protein processing and assembly in live cells
National Institutes of Health NIH NIAID R01AI168459-01A1 \$2,278,589
 8-6-2021 to 7-31-2022 Snow (PI), Stasevich (PI), Geiss (Co-I)

COVID-19: Defining the Translocation Mechanisms of SARS-CoV-2 nsp13 Helicase to Aid in Antiviral Development
National Institutes of Health NIH NIAID 1 R01 AI166050-01 \$2,229,089
 8/2021 – 7/2026 (PIs: McCullagh, Geiss, Co-I Snow)

Transformative pandemic response infrastructure: an integrated device for automated wastewater sampling and simultaneous molecular capture of infectious agents
Anschutz Foundation \$200,000
 10/2021 – 9/2023 De Long (PI), Wilusz (co-PI), Snow (co-PI)

Tracking mosquito movements from birth to bite
CSU One Health Institute \$4,800
 05/2021 – 08/2021 (PI: VandeWoude)

SBIR Phase II: Sustainable production of high-performance dietary supplements
National Science Foundation SBIR 2139470 / Sasya LLC \$995,239
 8-1-2022 – 7-31-2024 Vemuri (PI), Snow (subcontract PI)

Sustainable production of high-performance dietary supplements
Foundation for Food & Agricultural Research Sasya LLC \$158,657
 5-1-2023 – 4-30-2025 Vemuri (PI), Snow (subcontract PI)

Self-assembly and dynamic reconstruction of expanded biomolecular co-crystals
National Science Foundation \$436,772
 9-1-2023 – 8-31-2026 Snow (PI)

Bioimaging Using Luminescent Lanthanide Complexes (LLC)
Walter Scott Jr. Foundation \$50,000
 1-1-2024 – 6-30-2024 Kipper (PI), Snow (Co-PI)

Machine-Learning Aided Design of Avidity-Based Biosensors of Ubiquitin Signaling
National Institutes of Health PENDING (7% score) \$2,730,252
 4-1-2024 – 3-31-2029 Snow (Co-PI)

INVITED TALKS (Selected)

- Colorado School of Mines. *Golden* 2024
- ACS meeting. *Laramie* 2023
- NIH training program keynote. *Fort Collins* 2023
- Qingdao University. *Qingdao* 2023
- GoogleX, *Virtual* 2022

- Tolmar, *Virtual* 2022
- Translational Medicine Institute, *Fort Collins* 2022
- Denver University. *Denver* 2022
- Brigham Young University, *Virtual. Salt Lake City* 2021
- The 5th International Conference on Molecular Simulation, *Jeju, Korea* 2019
- KAIST, *Daejeon, Korea* 2019
- Tokyo Institute of Technology, *Tokyo, Japan* 2019
- Kansas University. *Lawrence* 2019
- 257th ACS National Meeting. *Orlando* 2019
- Hybrid Materials Symposium: *Qingdao University, China* 2017
- NSF Nanoscale Science and Engineering Grantees Conference, *Arlington* 2016
- Dartmouth, *Hanover* 2016
- UNC, *Chapel Hill* 2016
- Colorado School of Mines, *Golden* 2015
- United States Army Natick Soldier Research, Development, and Engineering, *Natick* 2015
- Protein Society Topical Panel Discussion, *Barcelona, Spain* 2015
- Protein Society Topical Panel Discussion, *Boston* 2013
- Kansas State University, *Manhattan* 2013
- UC Boulder Seminar Series, *Boulder* 2012
- National Renewable Energy Laboratory, *Golden* 2012
- Society for Industrial Microbiology – Biocatalysts By Design, *New Orleans* 2011
- American Chemical Society – Emerging Topics in Protein Engineering, *Anaheim* 2011
- MIT, University of Michigan, WUSTL, Boston University 2011
- Caltech Sustainable Energy Conference, Einstein COM, U British Columbia, Stanford, NIH 2010
- Princeton, Yale, Stanford, Cornell, MIT, Berkeley, Monash University 2010

TEACHING

- CBE310:** Molecular Concepts and Applications (each year 2017 – 2023)
CBE201: Material and Energy Balances (each year 2012– 2017)\
CBE570: Biomolecular Engineering & Synthetic Biology (most years 2013 – 2024)
BIOM570: Bioengineering. (guest lectures most years 2011-2023)
AGRI601: Bioenergy Technology. (guest lectures 2012, 2013, 2014)

SERVICE

- American Institute of Chemical Engineers Faculty Advisor** 2015 - 2016
School of Biomedical Engineering Seminar Committee 2015 - 2016
Engineering Student Technology Committee: 2013 – 2015, 2017 – 2018, 2023 – 2024
BIOMOD Student Organization Advisor: 2017 – present

Grant Review/Referee:

- Vidi Research Proposal Review, December 2013
- NSF Proposal Panel Review, December 2014
- NSF Proposal Review, February 2015
- E-Rare Transnational Research Projects on Rare Diseases Proposal Review, August 2015
- Israel Science Foundation Proposal Review, May 2016
- NSF Panel Review, February 2016
- NSF Proposal Review, May 2016
- ACS PRF Proposal Review, July 2016
- External Sabbatical Review, Oct 2018
- CCTSI Proposal Review, Nov 2019
- Israel Science Foundation Proposal Review, Feb 2020
- NSF Proposal Review, Feb 2021
- NSF Proposal Review, Apr 2021
- Tenure Review, Sep 2021

Major Advisor for the Following Students:

- Ph.D. program, Alec Jones, Sixth-Year, Bioengineering
Area of Study: Protein Crystal Sensors, RNA Delivery
- Ph.D. program, Jacob DeRoo, Fifth-Year, Bioengineering *[Joint Advisor]*
Area of Study: Atomic Force Microscopy of Porous Protein Crystals
- Ph.D. program, Szu-Hsuan Chen, Fourth-Year, Chem. Bio. Engr.
Area of Study: Host-guest crystal transport modeling
- Ph.D. program, Ethan Shields, Third-Year, Bioengineering
Area of Study: Co-crystal Engineering & olfactory sensing
- Ph.D. program, Rachel Cohen, Third-Year, Chemistry
Area of Study: Enzyme engineering
- Ph.D. program, Callie Slaughter, Third-Year, Cell & Molecular Biology Program
Area of Study: Co-crystals, DNA barcodes
- Ph.D. program, Emma Magna, Second-Year, Cell & Molecular Biology Program
Area of Study: Co-crystals engineering
- Ph.D. program, Austin Knight, Second-Year, Biochemistry & Molecular Biology
Area of Study: Enzyme engineering and design
- Ph.D. program, John League, First-Year, Chemistry
Area of Study: Protein crystal production optimization

Group Alumni

- Ph.D. program, Abigail Ward, Chemistry
Area of Study: Co-crystal Engineering
- Ph.D. program, Julius Stuart, Chemistry
Area of Study: Protein Crystal Sensors, Biophysics, and DNA Barcoding
- M.S. program, Mahmoud Masri, Fourth-Year, Chem. Bio. Engr.
Area of Study: RNA Delivery
- M.S. program, Michael Scroggins, Third-Year, Bioengineering
Area of Study: Enzyme engineering for olfactory sensing

- Ph.D. program, Dafu Wang, Fourth-Year, SAMD *[Joint Advisor]*
Area of Study: Atomic Force Microscopy of Porous Protein Crystals
- Ph.D. program, Angeline Ta *[late stage advisor]*
Thesis (2018): Protein Engineering for Therapeutic Strategies and Tools
- Ph.D. program, Ann Kowalski
Thesis (2018): Protein Crystals as Nanotemplating Materials
- Ph.D. program, Luke Hartje
Thesis (2018): Characterizing Porous Protein Crystal Materials for Applications in Nanomedicine and Nanobiotechnology
- Ph.D. program, Thaddaus Huber
Thesis (2017): Towards Macromolecular Scaffold Assisted Crystallography
- Ph.D. program, Lucas Johnson
Thesis (2016): Engineering Stabilized Enzymes
- M.S. program, Mark Lunt
Thesis (2015): Software for the Use of Protein Fragment Recombination and Regression in Protein Structure Determination and Design
- M.S. program, Jacob Sebesta
Thesis (2015): Software to Design Crosslinks for Specific Protein Crystal Stabilization
- Postdoctoral Fellow, Gayani Dedduwa-Mudalige
Area of Study (2018): Fluorescent Protein Engineering

Professional Memberships

- Protein Society
- American Chemical Society
- AAAS
- AIChE
- Society for Biological Engineering (AIChE community)

Pre-Collegiate Outreach

In collaboration with Ethan Dusto, an AP Chemistry teacher at Cherry Creek High School and Steve Albers, (i) a Ph.D. student in the Chemical and Biological Engineering department, (ii) a former high school teacher in the Creek school district (Denver) and, (iii) a recent recipient of an AFRI-NIFA fellowship to implement Synthetic Biology educational outreach within 2 Colorado school districts, the Snow laboratory developed a module to aid in visualization and understanding of intermolecular forces and their importance in protein folding and stability. Background information regarding hydrogen bonds, electrostatic interactions, and hydrophobic packing were introduced in parallel with tradition AP Chemistry content over a series of four video lectures that I produced. At the end of the unit, students designed their own experiment to study the effects of changing environmental conditions on the activity of a relevant human health enzyme, pepsin. We have also worked with several high-school summer interns.

Undergraduate Research Service

I serve as a faculty mentor for a CSU student organization (CSU BIOMOD). With assistance from a Ph.D. student in my group we assembled a team of undergraduate students (and a summer high school intern) to conduct innovative biomolecular design and assembly research. BIOMOD is an international biomolecular design competition. In our first year, nearly the entire team (8 undergraduates) as well as

the graduate student mentor accompanied me to the Jamboree at UCSF. The CSU students had ample opportunities to talk about highly creative research projects with other student scientists from across the globe. In our first year, we competed well with respect to established, highly polished programs, ultimately reaching the middle “silver” tier according to the evaluations of the students’ presentation, explanatory video, and website. In addition to attending regular BIOMOD meetings, I provide the students with laboratory access and materials.

Synergistic Activities

1. Development of Open-Source Computational Tools for Protein Research: Dr. Snow is actively developing (2007-) an open-source software library, SHARPEN (www.sharp-n.org), for protein modeling and design. This software was designed from the ground up to enable non-programmers to contribute to the development of new algorithms. Whereas academic software is often limited by insufficient documentation, we have built an interactive online training resource (DrillBits). The DrillBits tutorial website also encompasses Linux, Python, Matlab, and PyMOL, key tools necessary to transform undergraduate students into effective undergraduate researchers. These free, online resources build off my previous efforts with the Folding@Home distributed computing project (2001-2006), where I implemented the database that tracked the molecular dynamics simulation contributions of hundreds of thousands of volunteers.

2. Interdisciplinary Collaborations with groups outside my lab include the development of hybrid lanthanide protein crystals with Dr. Jianguo Tang at Qingdao University, generating structural models of protein evolution with Dr. Dan Sloan at Colorado State University, developing algorithms for the detection and quantification of cavities in protein structures with Dr. Eric Brustad at the University of North Carolina at Chapel Hill, developing multifunctional materials for integration into textiles with a team at the United States Army Natick Soldier Research, Development, and Engineering Center, and development of next-generation fluorescent protein probes for intracellular imaging with Drs. Tim Stasevich and Brian Geiss at CSU, and developing multifunctional materials for integration into textiles with a team at the United States Army Natick Soldier Research, Development, and Engineering Center. Most recently, we have also initiated a collaboration with Dr. Rebekah Kading at CSU to deploy DNA-laden engineered microcrystals for mosquito tracking. We are also collaborating with Dr. Katherine Horak at the National Wildlife Research Center to evaluate use of our crystals for the oral delivery of RNA. We are also collaborating with Dr. Christopher Ackerson (CSU Chemistry) to develop proteins that catalyze the formation of nanoparticles inside living cells for electron microscopy. Broad interdisciplinary interests of the group have also led to zero-time appointments in the Department of Biochemistry & Molecular Biology, the Department of Chemistry, the School of Biomedical Engineering, the School of Advanced Materials Discovery, and the Graduate Program in Cell and Molecular Biology.

3. Curriculum Development: Dr. Snow developed (2013-) a new Colorado State University Chemical and Biological Engineering course: CBE570: *Biomolecular Engineering & Synthetic Biology* focused on student-led design challenge projects. This course draws interdisciplinary interest across the University, bringing together motivated students from the Chemical and Biological Engineering department, the Biochemistry and Molecular Biology department, and beyond. To learn best practices as a new teacher, the PI attended the ASEE Summer School for Chemical Engineering Faculty in 2012.

4. Student-Facing Service Contributions: Dr. Snow served as faculty representative for the student chapter of the American Institute of Chemical Engineers (AIChE, 2015-2016), and faculty

member of the Engineering Student Technology Committee (2013-2015, 2017-2018). Since 2017, he supports the BIOMOD student organization, a semi-autonomous student group dedicated to creative biomolecular engineering projects at CSU. Since its inception in 2021, he has supported teams of MURALS first year scholars, a program that brings 1st-year undergraduates from under-represented backgrounds into research groups.

5. Professional Society Contributions: Dr. Snow is a longtime member and contributor to the Protein Society, with annual Symposium attendance from 1998. Contributions include a chaired symposium session on applied protein research (2016), career development panel sessions (2016 and 2015), a panel session on the future of rational protein design and directed evolution (2013), poster judging service (2007-2015), and best poster awards (2004, 2005). From 2019 to 2023, Dr. Snow was the chair of the Abstracts Committee.

6. Community Service Contributions: In 2020, Dr. Snow took a position on the Editorial Board of the journal *Crystals*. He also was Associate Senior Editor for the journal *Protein Engineering, Design, and Selection* from 2022-2023.