CURRICULUM VITAE

Byron W. Purse, Ph.D.
Associate Professor
Department of Chemistry and Biochemistry
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-1030
(619) 594-6215
bpurse@sdsu.edu
http://purselab.sdsu.edu/

EDUCATION

Stockholm University, Sweden	6/2008
Postdoctoral Fellow	Organic Chemistry
The Scripps Research Institute, USA	11/2005
Ph.D. Student	Organic Chemistry
University of Regina, Canada	5/2000
B.Sc. with High Honours	Chemistry and Biochemistry

PROFESSIONAL APPOINTMENTS

Associate Professor	Fall 2018 – Present
San Diego State University	Organic Chemistry
Assistant Professor	Fall 2013 – Summer 2018
San Diego State University	Organic Chemistry
Assistant Professor	Fall 2008 – Spring 2013
University of Denver	Organic Chemistry

Legend for Student Contributions to Publications and Conferences (following pages)

[a] undergraduate in my group
[b] graduate student in my group
[c] postdoc in my group

PROFESSIONAL GROWTH

Refereed Journal Articles (H-index: 15, * indicates corresponding author)

At SDSU

24. Bernatchez, J.A.; Yang, Y.; Coste, M.;[b] Li, J.; Beck, S.; Liu, Y.; Clark, A.E.; Zhu, Z.; Luna, L.A.; Sohl, C.; **Purse, B.W.**; Li, R.; Siqueira-Neto, J.L. Development and validation of a phenotypic high-content imaging assay for assessing the antiviral activity of small-molecule inhibitors targeting the Zika virus. *Antimicrob. Agents Chemother.* **2018**, *in press.* http://dx.doi.org/AAC.00725-18
23. Journey, S.N.;[a] Teppang, K.L.;[a] Garcia, C.A.;[a] Brim, S.A.;[a] Onofrei, D.;[b] Addison, J.B.; Holland, G.P.; **Purse, B. W.*** Mechanically Induced Pyrogallol[4]arene Hexamer Assembly in the Solid State Extends the Scope of Molecular Encapsulation. *Chem. Sci.* **2017**, *8*, 7737–7745. http://dx.doi.org/10.1039/C7SC03821F
    9th rank in all chemistry journals; impact factor 8.67
22. Burns, D. D.;[b] Teppang, K. C.;[a] Lee, R. W.;[a] Lokensgard, M.; **Purse, B. W.*** Fluorescence turn-on sensing of DNA duplex formation by a tricyclic cytidine analogue. *J. Am. Chem Soc.* **2017**, *139*, 1372–1375.
    5th rank in all chemistry journals; impact factor 13.89
21. Rodgers, B.J.;[b] Elsharif, N.A.;[b] Vashisht, N.;[a] Mingus, M.M.;[a] Mulvahill, M.A.;[a] Stengel, G.; Kuchta, R.D.; **Purse, B.W.*** Functionalized Tricyclic Cytosine Analogues Provide Nucleoside Fluorophores with Improved Photophysical Properties and a Range of Solvent Sensitivities. *Chem. Eur. J.* **2014**, *20*, 2010–2015.
    28th rank in all chemistry journals; impact factor 5.29
20. Mehdizadeh, E.; Chapin, J.C.;[b] Gonzales, J.M.; Rahafrooz, A.; Abdolvand, R.; **Purse, B.W.**; Pourkamali, S. Microelectromechanical disk resonators for direct detection of liquid-phase analytes. *Sensor Actuat A–Phys* **2014**, *216*, 136–141.
    71st rank in all engineering journals; impact factor 2.62
19. Chapin, J.C.;[b] **Purse, B.W.*** Guest loading, chromatographic purification, and controlled release from kinetically trapped, hydrogen-bonded pyrogallol[4]arene capsules. *Supramol. Chem.* **2014**, 7–8, 517–520.
    361st rank in all chemistry journals; impact factor 1.12

At the University of Denver

18. Chapin, J.C.;[b] Kvasnica, M.;[c] **Purse, B.W.*** Molecular Encapsulation in Pyrogallolarene Hexamers Under Nonequilibrium Conditions, *J. Am. Chem. Soc.* **2012**, *134*, 15000.
    5th rank in all chemistry journals; impact factor 13.89
17. Stengel, G.; **Purse, B.W.**; Kuchta, R.D. Effect of transition metal ions on the fluorescence and Taq-catalyzed polymerase chain reaction of tricyclic cytidine anologues, *Anal. Biochem.* **2011**, *416*, 53-60.
    121st rank in all biochemistry journals; impact factor 2.16
16. Kvasnica, M.;[c] Chapin, J.C.;[b] **Purse, B.W.*** Efficient Loading and Kinetic Trapping of Hexameric Pyrogallolarene Capsules in Solution, *Angew. Chem. Int. Ed.* **2011**, *50*, 2244-2248.
    7th rank in all chemistry journals; impact factor 11.99
15. Kvasnica, M.;[c] **Purse, B.W.*** Specific Tetramethylammonium Recognition Drives General Anion Positioning in Tandem Sites of a Deep Cavitand, *New J. Chem.* **2010**, *34*, 1097-1099.
    126th rank in all chemistry journals; impact factor 2.76
14. Stengel, G.; Urban, M.; **Purse, B.W.**; Hocek, M.; Kuchta, R.D. Incorporation of the fluorescent nucleotide analogue tCTP by T7 RNA polymerase, *Anal. Chem.* **2010**, *82*, 1082-1089.
    28th rank in all chemistry journals; impact factor 6.42

13. Urban, M.; Joubert, N.; **Purse, B.W.**; Hocek, M.; Kuchta, R.D. Mechanisms by Which Human DNA Primase Chooses to Polymerize a Nucleoside Triphosphate, *Biochemistry* **2010**, *49*, 727-735.
    51st rank in all biochemistry journals; impact factor 2.98
12. Stengel, G.; Urban, M.; **Purse, B.W.**; Kuchta, R.D. High density labeling of PCR products with the fluorescent analogue tCo, *Anal. Chem.* **2009,** *81*, 9079-9085.
    11th rank in all chemistry journals; impact factor 6.42
11. Stengel, G.; **Purse, B.W.**; Wilhelmsson, L.M.; Urban, M.; Kuchta, R.D. Ambivalent incorporation of the fluorescent cytosine analogues tC and tCo by human DNA polymerase α and Klenow Fragment, *Biochemistry* **2009**, *48*, 7547-7555.
    51st rank in all biochemistry journals; impact factor 2.98

Prior to having an independent lab

10. **Purse, B.W.**; Butterfield, S.M.; Ballester, P.; Shivanyuk, A.; Rebek, J., Jr. Interaction Energies and Dynamics of Acid–Base Pairs Isolated in Cavitands, *J. Org. Chem*, **2008**, *73*, 6480-6488. (featured article)
9. Johansson, M.; **Purse, B.W.**; Terasaki, O.; Bäckvall, J.-E. Aerobic oxidations catalyzed by a zeolite-encapsulated cobalt salophen complex, *Adv. Synth. Catal.*, **2008**, *350*, 1807-1815.
8. **Purse, B.W.**; Tran, L.-H.; Piera, J.; Åkermark, B,; Bäckvall, J.-E. Synthesis of New Hybrid Hydroquinone-Cobalt Schiff Base Catalysts: Efficient Electron Transfer Mediators in Aerobic Oxidations, *Chem. Eur. J.*, **2008**, *14*, 7500-7503.
7. **Purse, B.W.**; Rebek, J., Jr. Self-Fulfilling Cavitands: Packing Alkyl Chains into Small Spaces, *Proc. Natl. Acad. Sci. USA*, **2006**, *103*, 2530-2534.
6. **Purse, B.W.**; Gissot, A.; Rebek, J., Jr. A Deep Cavitand Provides a Structured Environment for the Menschutkin Reaction, *J. Am. Chem. Soc.* **2005**, *127*, 11222-11223.
5. **Purse, B.W.**; Rebek, J., Jr. Functional cavitands: Chemical reactivity in structured environments, *Proc. Natl. Acad. Sci. USA* **2005**, *102*, 10777-10782. (cover article)
4. **Purse, B.W.**; Rebek, J., Jr. Encapsulation of oligoethylene gylcols and perfluoro-*n*-alkanes in a cylindrical host molecule, *Chem. Commun.*, **2005**, 722-724.
3. **Purse, B.W.**; Ballester, P., Rebek, J., Jr. Reactivity and molecular recognition: amine methylation by an introverted ester, *J. Am. Chem. Soc.* **2003**, *125*, 14682-14683. (featured in *C&E News*, November 17, 2003).
2. **Purse, B.W.**; Shivanyuk, A.; Rebek, J., Jr. Resorcin[6]arene as a building block for tubular crystalline architectures, *Chem. Commun.*, **2002**, 2612-2613.
1. Nitz, M.; **Purse, B.W.**; Bundle, D.R. Synthesis of a β1,2-mannopyranosyl tetrasaccharide found in the phosphomannan antigen of *Candida albicans*, *Org. Lett.* **2000**, *2*, 2939-2942.

Refereed Book Chapters

1. Chapin, J.C.;[b] **Purse, B.W.** *cis,cis*-1,3,5-Trimethyl-1,3,5-cyclohexanetricarboxylic acid (Kemp's Triacid) *Encyclopedia of Reagents for Organic Synthesis*, **2015**.

Refereed Proceedings

1. Narenji, A. G.; Goshi, N.; Coste, M.; Burns, D.;[b] Lee, R.;[b] Ngo, K.;[a] **Purse, B.;** Kassegne, S. Microelectromechanical disk resonators for direct detection of liquid-phase analytes. *ECS Transactions* **2016**, *72*, 21–27.

Publications in Process

Scholarly Awards

1. Swedish Research Council Postdoctoral Fellowship, Stockholm University, 2007
2. Natural Sciences and Engineering Research Council of Canada Postgraduate Scholarship A, The Scripps Research Institute, 2001–2003
3. Skaggs Fellowship, The Scripps Research Institute, 2001–2005
4. Society of Chemical Industry Merit Award, University of Regina, 2000
5. Chemical Institute of Canada Book Prize, University of Regina, 2000
6. University of Regina General Proficiency Scholarship, 1999–2000
7. The Canadian Society for Chemistry Silver Medal, University of Regina, 1999
8. Undergraduate Award in Analytical Chemistry, University of Regina, 1999

Funded External Research Grants

Held at SDSU

1. $414,000, Next-Generation Fluorescent Nucleosides and Structure-Photophysics Relationships, PI, NSF Division of Chemistry, Chemical Structure, Dynamics and Mechanisms B Program (CHE-1800529), 2018–2021
2. $130,000, *Bright and responsive fluorescent nucleosides from structure-photophysics relationships*, PI, NSF Division of Chemistry, Chemical Structure, Dynamics and Mechanisms B Program (CHE-1709796), 2017–2019.
3. $100,000, *Mechanical Control of Molecular Encapsulation*, PI, ACS Petroleum Research Fund New Directions Grant, 2012–2015.
4. $416,000, *Development of Novel Nucleoside Triphosphate Prodrugs*, PI w/ Prof. Robert Kuchta, CU Boulder, NIH NIAID R21 Grant (*AI0925401*), 2011–2014.

Held at the University of Denver prior to my appointment at SDSU

5. $348,000, *Novel Fluorescent Nucleotides Analogues to Probe Nucleic Acid Metabolism*, PI, NIH National Institute of General Medical Sciences R15 Grant (*GM093943*), 2010–2013.
6. $72,000, *Development of a Nanomechanical Biosensing Platform*, PI w/ Prof. Siavash Pourkamali, University of Denver, Colorado Bioscience Discovery Evaluation Proof of Concept Grant, 2011–2012.
7. $60,000, *A Comprehensive Developmental Study of Nanoporous Micro-Electromechanical Resonant Gas Sensors*, PI w/ Prof. Siavash Pourkamali, University of Denver, University of Denver Interdisciplinary Research Award, 2011–2012.
8. $40,000, *A New Prodrug Approach to Generate Improved Nucleoside Analogues for Cancer Chemotherapy*, PI w/ Prof. Robert Kuchta, CU Boulder, Cancer League of Colorado Research Grant, 2010–2011.

Awarded Internal Research Grants

1. $15,000, *Fluorescently Labeled Riboswitch Constructs for Ligand and Drug Discovery*, California State University Program for Education and Research in Biotechnology (CSUPERB) New Investigator Grant, 2016–2017.
2. $12,000, *Fluorescent Motifs in Biomimetic Nucleoside Structures*, PI, SDSU Stephen Welter Fund, 2016–2017.
3. $10,000, *Controlling Molecular Capsules using Mechanical Forces*, PI, SDSU University Grants Program, 2016–2017.
4. $15,000, *Modifying Drugs and Molecular Probes for Enhanced Delivery*, PI, CSUPERB New Investigator Grant, 2015–2016
5. $10,000, *New Chemical Tools for Studying DNA Damage*, PI, SDSU President's Leadership Fund, 2014–2015

6. $10,000, *Minimally Perturbing Fluorescent Labels for Nucleic Acids*, PI, SDSU University Grants Program, 2014–2015.

Patent Filings

1. Provisional Patent Application Nos. 62/420,347 and 62/533,897 (2016, 2017) B.W. Purse, D. Burns, K. Teppang, R. Lee, M. Lokensgard *Tricyclic Cytidine Compounds for Fluorescence Turn-On Sensing of DNA Duplex Formation.*
2. Patent Application No. WO 2011034895 (2011) R.D. Kuchta, G. Stengel, M. Urban, and **B.W. Purse.** *Compositions, Methods and Uses for Nucleotide Analogues.*

Invited Lectures

1. **Carnegie Mellon University**, upcoming in September 2018.
2. **University of Maryland, Baltimore County**, *Designing Fluorescent Nucleoside Analogues for New Applications in Biophysics*, upcoming on October 27, 2017.
3. **University of California, Irvine**, *Designing Fluorescent Nucleoside Analogues for New Applications in Biophysics*, March 6, 2017.
4. **University of California, Santa Barbara**, *Chemistry, Photophysics and Polymerase Compatibility of Fluorescent Cytidine Analogues,* April 29, 2016.
5. **University of California, San Diego**, *Hydrogen Bonded Molecular Capsules with Very High Kinetic Stability: Supramolecular Synthesis and Controlling Reactivity*, April 25, 2016.
6. **The Scripps Research Institute, La Jolla**, *Chemistry, Photophysics and Polymerase Compatibility of Fluorescent Cytidine Analogues*, April 19, 2016.
7. **California State University, Channel Islands**, *Chemistry, Photophysics, and Polymerase Compatibility of Fluorescent Cytidine Analogues*, October 2, 2015.
8. **Prof. David Bundle Retirement Symposium at the University of Alberta, Canada**, *Fluorescent cytidine analogues for biophysical applications*, July 17, 2015.
9. **California State University, Los Angeles**, *Kinetically Stable Molecular Encapsulation Complexes: Supramolecular Synthesis and Control of Reactivity*, February 10, 2015.
10. **University of California, Riverside**, *Kinetically Trapped, Hydrogen Bonded Molecular Encapsulation Complexes*, 3 May 2013.
11. **San Francisco State University,** *New Fluorescent Nucleoside Analogues for Biophysics and Medicine(?)*, 18 February 2013.
12. **San Diego State University,** *New Fluorescent Nucleoside Analogues for Biophysics and Medicine(?)*, 23 January 2013.
13. **Ohio University**, *Kinetically Trapped Molecular Encapsulation Complexes: Towards Applications of Supramolecular Chemistry in Nonequilibrium Systems*, 15 October 2012.
14. **University of Northern Colorado**, *Towards New Applications of Molecular Encapsulation*, 12 November 2010.
15. **Freiburg University, Germany**, *New Unnatural Nucleotides for Biochemistry, Biophysics, and Medicine*, 13 October 2010.
16. **University of Colorado Cancer Center Retreat, Denver, CO**, *Towards New Unnatural Nucleotides for Biochemistry, Biophysics, and Medicine*, 10 September 2010.
17. **Hamburg University, Germany**, *New Unnatural Nucleotides for Biochemistry, Biophysics, and Medicine*, 6 September 2010.
18. **University of Colorado, Denver**, *Keeping Things Organized: Using Supramolecular and Covalent Arrangement of Reactants to Control Chemistry*, 6 March 2009.
19. **Georg-August Universität,** Göttingen, Germany, *Keeping Things Organized: Using Supramolecular and Covalent Arrangement of Reactants to Control Chemistry,* 22 February 2008.

20. **University of Denver**, *Keeping Things Organized: Using Supramolecular and Covalent Arrangement of Reactants to Control Chemistry,* March 2008.
21. **Concordia University**, Montreal, Canada, *Keeping Things Organized: Using Supramolecular and Covalent Arrangement of Reactants to Control Chemistry.* 14 January 2008.

Conference Contributions

1. **Purse, B.W.** *Rational Design of Brighter, More Responsive Fluorescent Nucleosides*, Fluorescent Biomolecules and their Building Blocks (FB^3), Glasgow, UK, June 30–July 3, 2018, Oral.
2. **Purse, B.W.** *A Sequence-Specific Fluorescence Turn-on Nucleoside Analogue*, Nucleosides, Nucleotides & Oligonucleotides Gordon Research Conference, Newport, RI, June 25-30, 2017, Oral.
3. **Purse, B.W.** *Photophysics and Polymerase Fidelity of Fluorescent Cytidine Analogues*, 22^{nd} International Round Table on Nucleosides, Nucleotides and Nucleic Acids, Paris, France, July 18-22, 2016, Poster.
4. **Purse, B.W.** *Controlling photophysics and the fidelity of DNA synthesis using substituted cytidine analogues*, 251st American Chemical Society National Meeting & Exposition, San Diego, CA, Mar. 13-17, 2016; Oral presentation.
5. **Purse, B.W.** *Electronic Substituent Effects Control Photophysical Properties and the Fidelity of Fluorescent Nucleotide Insertion by DNA Polymerases*, Gordon Research Conference on Nucleosides, Nucleotides & Oligonucleotides, Newport, RI, United States, June 28-July 3, 2015; Poster.
6. **Purse, B.W.**; Chapin, J.C.; Teppang, K.C. *Chemical Compartmentalization for Controlling Reactivity in Pyrogallolarene Hexamers*, The 9th International Symposium on Macrocyclic and Supramolecular Chemistry, Shanghai, China, June 7-June 11, 2014; Poster.
7. Rodgers, B.J.; El Sharif, N.; Vashisht, N.; Mingus, M.; Stengel, G.; Mulvahill, M.; Kuchta, R.D.; **Purse, B.W.** *New Fluorescent, Minimally Perturbing, and Systematically Derivatized Cytidine Analogues*, Gordon Research Conference on Nucleosides, Nucleotides & Oligonucleotides, Newport, RI, United States, June 30-July 5, 2013; Poster.
8. **Purse, B.W.**; Chapin, J.C.; Kvasnica, M.; La Belle-Hamer, H.M. *NMR reveals variable degrees of order inside the cavity of pyrogallolarene hexamers*, 243rd ACS National Meeting & Exposition, San Diego, CA, United States, March 25-March 29, 2012; Oral presentation.
9. **Purse, B.W.**; Chapin, J.C.; Kvasnica, M. *Unusually stable encapsulation complexes from solvent-free self-assembly of pyrogallolarene*, 242nd ACS National Meeting & Exposition, Denver, CO, United States, August 28-September 1, 2011; Lecture.
10. Chapin, J.C.; Kvasnica, M.; **Purse, B.W.** *Kinetics and Thermodynamics of Guest Binding in Hexameric Pyrogallolarene Capsules*, ISMSC 2011, Brighton, UK, July 2011; Poster.
11. **Purse, B.W.** *Towards an Ion-Pairing Approach to Supramolecular Catalysis*, ACS National Meeting, Salt Lake City, UT, USA, March 2009.
12. **Purse, B.W.**; Tran Lien-Hoa Tran, Julio Piera, Björn Åkermark, and Jan-Erling Bäckvall. Tethering Oxidation Catalysts Improves their Cooperativity: A Hydroquinone–Cobalt Salophen Hybrid for Aerobic Oxidation. Presented at the ICREA + ICIQ Supracat 2008 Conference, Barcelona, Spain, March 2008.
13. **Purse, B.W.**; Tran, L.-H.; Piera, J.; Åkermark, B,; Bäckvall, J.-E. A cobalt salophen-hydroquinone hybrid for biomimetic aerobic oxidation. 2nd SELCHEM-Network Conference on Catalysis and Synthesis, Sigtunahöjden, Sweden, November 20-21, 2007.

14. **Purse, B.W.**; Gissot, A.; Rebek, J., Jr. Supramolecular Encapsulation Increases the Rate of Alkylation of Quinuclidine. Presented at the 229th ACS National Meeting, San Diego, CA, March 2005; Poster.
15. **Purse, B.W.**; Ballester, P.; Rebek, J., Jr. Reactivity studies of a host with an inwardly-directed carboxylic acid. Presented at the 13th International Symposium on Supramolecular Chemistry, University of Notre Dame, IN, July, 2004; Poster.
16. **Purse, B.W.**; Ballester, P.; Rebek, J., Jr. Reactivity studies of a host with an inwardly-directed carboxylic acid. The 227th ACS National Meeting, Anaheim, CA, April 2004.
17. **Purse, B.W.**; Gibson, C.; Rebek, J., Jr. Recognition effects on region- and enantioselectivity in Pd-catalyzed allylic alkylations. Presented at the 224th ACS National Meeting, Boston, MA, August 2002; Poster.

Participation in Professional Associations

1. American Chemical Society, 1999–
2. Viromics Information Institute at SDSU, 2013–
3. University of Colorado Cancer Center, 2010–2013
4. Swedish Network for Solar Cells and Solar Fuels, 2006–2008
5. Brezelli Center EXSELENT on Porous Materials, 2006–2008