JULIE LE ENGERS

Vanderbilt Center for Neuroscience Drug Discovery
393 Nichol Mill Lane
Franklin, TN 37067

Phone: (615) 322-7415
Fax: (615) 343-9332
Email: Julie.engers@vanderbilt.edu

EDUCATION

Doctor of Philosophy in Organic Chemistry (2005)
The University of Texas at Austin, Texas
Advisor: Dr. Brian L. Pagenkopf
Dissertation title: *Design and Synthesis of New Bis(oxazoline)-Salen Ligand Metal Complexes for Catalytic Asymmetric Reactions*

Master of Science in Chemistry (2000)
Louisiana State University, Baton Rouge, Louisiana
Advisor: Steven Watkins

Bachelor of Science in Biochemistry (1998)
Louisiana State University, Baton Rouge, Louisiana

EXPERIENCE

03/2016-Present **Research Instructor** (promoted from Drug Discovery Scientist I)
Vanderbilt University, Nashville, TN
Vanderbilt Center for Neuroscience Drug Discovery (VCNDD)

- Provide leadership in the design and interpretation of Structure Activity Relationship (SAR) for numerous programs, including Muscarinic Acetylcholine Receptor M1 and M4
- Supervise research assistants, research fellows and visiting scientists on multiple drug discovery projects
- Coordinate and manage external profiling assays (as such Eurofins LeadProfiling Screen, Charles Rives Cardiac Channel Panel and SaVety Assessment, Reaction Biology Kinase Hotspot Panel, Mini-Ames) for lead series
- Assist Compound Management – coordinating material transfer agreement (MTA) execution, packaging and shipping compounds to collaborators

07/2013-02/2016 **Drug Discovery Scientist I**
Vanderbilt University Medical Center, Nashville, TN
Vanderbilt Center for Neuroscience Drug Discovery (VCNDD)

- Integral member of mGluR2/3/5 NAM, mGluR4 PAM and M1/M4 PAM project team resulting in 2 peer reviewed publications and 5 patent applications
- Highly efficient and productive in the design, synthesis of target molecules and interpretation of Structure Activity Relationship (SAR)
- Supervise research assistants and research fellows on multiple drug discovery projects

09/2008 – 06/2013 **Project Consultant of Research**
Vanderbilt University Medical Center, Nashville, TN
Vanderbilt Center for Neuroscience Drug Discovery (VCNDD)

- Project Manager for the Vanderbilt Specialized Chemistry Center for Accelerated Probe Development (NIH initiative Molecular Libraries Probe Production Center Network - MLPCN)
    - Managed work-flow for over 50 probe projects including chemistry fast track and extended characterization projects and ensure accountability and completion
    - Prepared chemical probe development plans (CPDPs), probe reports, interim and annual progress reports
    - Supervised Common Assay Report System (CARS) manager to ensure monthly FTEs, periodic project updates, primary and secondary screens data for internal projects and synthesized compounds timely update
    - Coordinated outreach efforts including processing material transfer agreements (MTAs), molecular probe and compound distribution and collaboration with network centers

- Project Consultant for Vanderbilt Center for Neuroscience Drug Discovery (VCNDD)
    - Provided administrative services and support to research faculty and staff with Medicinal Chemistry and Drug Metabolism and Pharmacokinetics focus
    - Managed scientific procurement, chemical and general consumable inventory and provide consultation to staff regarding purchase needs
    - Created and maintained center and research group websites

- Research Chemical Management Specialist for VCNDD (2009-2010)
    - Processed and registered qualifying new compounds into Vanderbilt compound library using Accelrys Accord Enterprise Workbench Client, Pipeline Pilot and DeltaSoft ChemCart Programs
    - Managed compound distribution for drug discovery program and external collaborators (Johnson & Johnson, Seaside Therapeutics, Michael J. Fox Foundation)

06/2008 – 12/2008 **Assistant Professor of Chemistry**
Vanderbilt University, Nashville, TN
Department of Chemistry
- Taught General Chemistry and Organic Chemistry lectures and lab courses
- Administered websites for all sections: Blackboard (OAK) and Mastering Chemistry (online homework system)

08/2005 – 05/2008 **Assistant Professor of Chemistry**
Rhodes College, Memphis, TN
Department of Chemistry
- Led undergraduate research program in Synthetic Organic Chemistry
- Taught chemistry senior seminars, Organic Chemistry and General Chemistry lectures and designed and developed laboratory courses
- Supervised Honor Senior Research projects with St. Jude Children's Research Hospital faculty
- Participated in development of new chemistry courses and revising of undergraduate chemistry curriculum
- Served as faculty advisor for Rhodes College Chapter Iota Sigma Pi – National Honor Society for Women in Chemistry and American Cancer Society: Colleges Against Cancer

HONOR AND AWARDS

- Best Poster Award at 2018 National Medicinal Chemistry Symposium (2018)
- Vanderbilt University Medical Center Recognize Award for Excellence in Service (2010 and 2011)
- Faculty Travel Award to attend the 2007 National Organic Symposium at Duke University
- Faculty Development Endowment Grant – Rhodes College (2006-2007)
- Gates Millennium Scholarship – Nationally Competitive Awards for Outstanding Minority Students Seeking Graduate Degree (2000-2005)
- Faraday Fellowship – The University of Texas Teaching Excellence in Chemistry (2002)
- David Burton, Jr. Fellowship – The University of Texas Graduate Fellowship (2001)

PROFESSIONAL DEVELOPMENT PROGRAMS

- Residential School on Medicinal Chemistry and Biology in Drug Discovery, Drew University, Madison, NJ. June 9-13, 2014
- Vanderbilt Program in Research Administration Development (VPRAD), Vanderbilt University, Nashville, TN. April 18-May 30, 2011

PROFESSIONAL AFFILATIONS AND OUTREACH EFFORTS

- American Chemical Society (2001 – Present)
- Iota Sigma Pi – National Honor Society for Women in Chemistry (2002 – Present)
- Williamson County School STEM Advisory Board Member (2018 – Present)

PUBLICATIONS

1. VU6007477, a novel M1 PAM based on a pyrrolo[2,3-b]pyridine carboxamide core devoid of cholinergic adverse events. **Engers, J.L.**; Childress, E.S.; Long, M.F.; Capstick, R.A.; Luscombe, V.B.; Cho, H.P. Dickerson, W.; Rook, J.M.; Blobaum, A.L.; Niswender, C.M.; Engers, D.W.; Conn, P.J.; Lindsley, C.W. *ACS Med Chem Lett*. **2018**, *9*(9), 917-922.
2. The discovery, SAR and biological characterization of a novel series of 6-((1H-pyrazolo[4,3-b]pyridin-3-yl)amino)-benzo[d]isothiazole-3-carboxamides as positive allosteric modulators of the metabotropic glutamate receptor 4 (mGlu4). Bollinger, S.; Engers, D.W.; Panarese, J.D.; West, M.; **Engers, J.L.**; Loch, M.T.; Rodriguez, A.L.; Blobaum, A.L.; Jones, C.K.; Thompson Gray, A.; Conn, P.J.; Lindsley, C.W.; Niswender, C.M.; Hopkins, C.R.; *J. Med. Chem*. **2018**, doi: 10.1021/acs.jmedchem.8b00994, [Epub ahead of print].
3. Discovery of tricyclic triazolo- and imidazopyridine lactams as M1 positive allosteric modulators (PAMs). **Engers, J.L**.; Bender, A.M.; Kalbfleisch, J.; Cho, H.P.; Ligenfelter, K.S; Luscombe, V.B.; Han, C.; Melancon, B.; Blobaum, A.L.; Niswender, C.M.; Emmitte, K.A.; Conn, P.J.; Lindsley, C.W. *ACS Chem Neurosci*. **2018**, doi: 10.1021/acschemneuro.8b00311, [Epub ahead of print].
4. Discovery and characterization of N-(1,3-dialkyl-1H-indazol-6-yl)-1H-pyrazolo[4,3-b]pyridin-3-amine scaffold as mGlu4 positive allosteric modulators that mitigate CYP1A2 induction liability. Engers, D.W.; Bollinger, S.R.; **Engers, J.L**.; Panarese, J.D.; Breiner, M. M.; Gregro, A.; Blobaum, A.L.; Bronson, J.J.; Wu, Y.J.; Macor, J.E.; Rodriguez, A.L.; Zamorano, R.; Conn, P.J.; Lindsley, C.W.; Niswender, C.M.; Hopkins, C.R. *Bioorg Med Chem Lett*. **2018**, *28*(15), 2641-2646.
5. Metabotropic glutamate receptor subtype 3 gates acute stress-induced dysregulation of amygdalo-cortical function. Joffe, M.E.; Santiago, C.I.; **Engers, J.L**.; Lindsley, C.W.; Conn PJ. *Mol. Psychiatry*. **2017**, Epub ahead of print. PMCID: PMC6013320.
6. Discovery of a novel 2,4-dimethylquinoline-6-carboxamide M4 positive allosteric modulator (PAM) chemotype via scaffold hopping. Long, M.F.; **Engers, J.L**.; Chang, S.; Zhan, X.; Weiner, R.L.;

Luscombe, V.B.; Rodriguez, A.L.; Cho, H.P.; Niswender, C.M.; Bridges, T.M.; Conn, P.J.; Engers, D.W; Lindsley, C.W. *Bioorg. Med. Chem. Lett.* **2017**, *27*(22), 4999-5001.

7. Design and synthesis of mGlu2 NAMs with improved potency and CNS penetration based on a truncated picolinamide core. Bollinger, K.A.; Felt, A.S.; Brassard, C.J.; **Engers, J.L**.; Rodriguez, A.L.; Weiner, R.L.; Cho, H.P.; Chang, S.; Bubser, M.; Jones, C.K.; Blobaum, A.L.; Niswender, C.M.; Conn, P.J.; Emmitte, K.A.; Lindsley, C.W. *ACS Med. Chem. Lett.* **2017**, *8*(9), 919-924.

8. Diverse effects on M1 signaling and adverse effect liability within a series of M4 Ago-PAMs. Rook, J.M.; Abe, M.; Cho, H.P.; Nance, K.D.; Luscombe, V.B.; Adams, J.J.; Dickerson, J.W.; Remke, D.H.; Garcia-Barrantes, P.M.; Engers, D.W.; **Engers, J.L**.; Chang, S.; Foster, J.J.; Blobaum, A.L.; Niswender, C.M.; Jones, C.K.; Conn, P.J.; Lindsley, C.W. *ACS Chem. Neurosci.* **2017**, *8*(4), 866-883.

9. Discovery and optimization of a novel series of highly CNS penetrant M4 PAMs based on a 5,6-dimethyl-4-(piperidin-1-yl)thieno[2,3-d]pyrimidine core. Wood, M.R.; Noetzel, M.J.; **Engers, J.L**.; Bollinger, K.A.; Melancon, B.J.; Tarr, C.J.; Han, C.; Gregro, A.R.; Lamsal,A.; Chang, S.; Ajmera, S.; Smith, E.; Chase, P.; Hodder, P.S.; Bubser, M.; Jones, C.K.; Hopkins, C.R.; Emmitte, K.A.; Niswender, C.M.; Wood, M. W.; Duggan, M.E.; Conn, P.J.; Bridges, T.M.; Lindsley, C.W. *Bioorg. Med. Chem. Lett.* **2016**, *26*(13), 3029-3033.

10. Discovery of a selective and CNS penetrant negative allosteric modulator of metabotropic glutamate receptor subtype 3 with antidepressant and anxiolytic activity in rodents. **Engers, J.L.**; Rodriguez, A.L.; Konkol, L.C.; Morrison, R.D.; Thompson, A.D.; Byers, F.W.; Blobaum, A.L.; Chang, S.; Venable, D.F.; Loch, M.T.; Niswender, C.M.; Daniels, J.S.; Jones, C.K.; Conn, P.J.; Lindsley, C.W.; Emmitte, K.A.. *J. Med. Chem.* **2015**, *58*(18), 7485-7500.

11. Design of 4-oxo-1-aryl-1,4-dihydroquinoline-3-carboxamides as selective negative allosteric modulators of metabotropic glutamate receptor subtype 2. Felts, A.S.; Rodriguez, A.L.; Smith, K.A.; **Engers, J.L.**; Morrison, R.D.; Byers, F.W.; Blobaum, A.L.; Locuson, C.W.; Chang, S.; Venable, D.F.; Niswender, C.M.; Daniels, J.S.; Conn, P.J.; Lindsley, C.W.; Emmitte, K.A. *J. Med. Chem.* **2015**, *58*(22), 9027-9040.

12. Substituted indoles as selective protease activated receptor 4 (PAR-4) antagonists: Discovery and SAR of ML354. Wen, W.; Young, S.E.; Duverany, M.T.; Schulte, M.L.; Nance, K.D.; Melancon, B.J.; **Engers, J.**; Locuson, C.W.; Wood, M.R.; Daniels, J.S.; Wu, W.; Lindsley, C.W.; Ham, H.E.; Stauffer, S.R. *Bioorg. Med. Chem. Lett*. **2014**, *24*(19), 4708-4713.

13. Discovery of (R)-(2-fluoro-4-((-4-methoxyphenyl)ethynyl)phenyl) (3-hydroxypiperidin-1-yl)methanone (ML337), an mGlu3 Selective and CNS Penetrant Negative Allosteric Modulator (NAM). Wenthur, C.J.; Morrsion, R.; Felts, A.S.; Smith, K. A.; **Engers, J. L.**, Byers, F.W.; Daniels, J. S.; Emmitte, K. A.; Conn, P. J. ; Lindsley, C. W. *J. Med. Chem.* **2013**, *56*(12), 5208-5212.

14. Discovery of ML326: the first sub-micromolar, selective M5 PAM. Gentry, P. R.; Bridges, T. M.; Lamasal, A.; Vinson, P. N.; Hodder, P. S.; **Engers, J. L**.; Rosen, H.; Niswender, C. M.; Daniels, J. S.; Conn, P. J.; Wood, M. R.; Lindsley, C. W. *Bioorg. Med, Chem. Lett.* **2013**, *23*(10), 2996-3000.

15. Discovery of a New Molecular Probe ML228: An Activator of the Hypoxia Inducible Factor (HIF) Pathway. Theriault, J.R.; Felts, A.S. Bates, B.S.; Perez, J.; Palmer, M.; Gilbert, S.R.; Dawson, E.S.; **Engers, J.L.;** Lindsley, C.W.; Emmitte, K.A. *Bioorg. Med, Chem. Lett.* **2012**, *22*, 76-81.

16. New Class of Substituted Aryl Bisoxazoline Ligands for Highly Enantioselective Copper Catalyzed Asymmetric Aldol Addition of Dienosilane to Pyruvate and Glyoxylate Esters. **Le, J. C-D.**; Pagenkopf, B. L. *Org. Lett.* **2004**, *6*, 4097-4099.

17. Asymmetric Hydrogenation of *Ortho*-Alkoxy Substituted Arylenamides**. Le, J. C-D.;** Pagenkopf, B. L. *J. Org. Chem.* **2004**, *69*, 4177-4180.

PUBLISHED PATENT APPLICATIONS

1. Lindsley, C.W.; Conn, P.J., Engers, D.W.; **Engers, J.L.**; Long, M.F. (2018) 'Positive allosteric modulators of the muscarinic acetylcholine receptor M4' WO 112312.
2. Lindsley, C.W.; Conn, P.J.; Bollinger, K.A.; Engers, D.W.; Blobaum, A.L.; **Engers, J.L.**; Rook, J.M. (2018) 'Positive allosteric modulators of the muscarinic acetylcholine receptor M1' WO 063552.
3. Lindsley, C.W.; Conn, P.J.; Engers, D.W.; Bollinger, S.; Tarr, J.C.; Spearing, P.; **Engers, J.L**.; Long, M.; Bridges, T.M. (2018). Positive allosteric modulators of the muscarinic acetylcholine receptor M4' WO 0369505.
4. Conn, P.J.; Lindsley, C.W.; Niswender, C.M.; Hopkins, C.R.; Bronson, J.; Wu, Y-Y.; Emmitte, K.A.; Panarese, J.; Engers, D.W.; **Engers, J.L.** (2018) 'Isoquioline and napthalene-substituted compounds as mGlu4 allosteric potentiators, compositions, and methods of treating neurological dysfunction' WO 0022745.
5. Conn, P.J.; Hopkins, C.R.; Lindsley, C.W.; Niswender, C.M.; Engers, D.W.; Panarese, J.; Bollinger, S.; **Engers, J.L.** (2018). 'Benzisoxazole-substituted compounds as mGlu4 allosteric potentiators, compositions, and methods of treating neurological dysfunction' WO 0021312.
6. Conn, P.J.; Lindsley, C.W.; Emmitte, K.A.; **Engers, J.L.**; Bollinger, K.A.; Breiner, M.M. (2018). 'Negative allosteric modulators of metbotropic glutamate receptor 3' WO 0022712.
7. Lindsley, C.W.; Conn, P.J.; Engers, D.W.; Bollinger, S.; Tarr, J.C.; Spearing, P.; **Engers, J.L**.; Long, M.; Bridges, T.M. (2018). Positive allosteric modulators of the muscarinic acetylcholine receptor M4' WO 0369505.
8. Conn, P.J.; Hopkins, C.R.; Lindsley, C.W.; Niswender, C.M.; Engers, D.W.; Panarese, J.; Bollinger, S.; **Engers, J.L**. (2018) 'Benzothiazole and benzisoxazole-substituted compounds as mGlu4 allosteric potentiators, compositions, and methods of treating neurological dysfunction' WO 0022744.
9. Lindsley, C.W.; Conn, P.J.; Engers, D.W.; Bollinger, K.A.; **Engers, J.L.** (2017). 'Preparation of substituted thienopyridine, pyrrolopyridine and pyrazolopyridine analogs as positive allosteric modulators of the muscarinic acetylcholine receptor M1' WO 143041.
10. Bender, A.M.; Conn, P.J.; Lindsley, C.W.; Emmitte, K.A.; Han, C.; **Engers, J.L**. (2016). 'Substituted imidazopyridine and triazolopyridine analogs as positive allosteric modulators of muscarinic acetylcholine receptor M1' WO172547.
11. Conn, P.J.; Lindsley, C.W.; Emmitte, K.A.; **Engers, J.L.**; Konkol, L.C. (2015). 'Negative allosteric modulators of metabotropic glutamate receptor 3' WO 0361081.

REFERENCES

Prof. Craig W. Lindsley
Vanderbilt University
Department of Pharmacology
1205 Light Hall
Nashville, TN 37232-0697
(615) 322-8700
craig.lindsley@vanderbilt.edu

Prof. P. Jeffrey Conn
Vanderbilt University
Department of Pharmacology
1205 Light Hall
Nashville, TN 37232-0697
(615) 936-2478
jeff.conn@vanderbilt.edu

Prof. Kyle A. Emmitte
UNT Health Science Center
Department of Pharmaceutical Science
3500 Camp Bowie Boulevard, RES-302B
Fort Worth, Texas 76107
(817) 735-0241
Kyle.Emmitte@unthsc.edu