

# The van Breemen Group and Chicago Mass Spectrometry Laboratory 2015 Newsletter

## Highlights of 2014

February, 2015  
Volume 4, Issue 1

An exciting development this year was the investiture of Richard van Breemen as the Matthias C. Lu Collegiate Professor of Pharmacy. Many of you will remember classes with Medicinal Chemistry

Professor Matt Lu, for whom this professorship is named. Our group published 17 papers this year, which is the most since 2005, and presented 25 papers/abstracts at meetings. Other highlights

include adding two new postdoctoral fellows, graduate student awards, and visiting former lab member Jinbo Fang at his university in Wuhan China. Read on for details of these events and more.

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**Investiture as the Matthias C. Lu Collegiate Professor of Pharmacy.** Front row: Lingyi Huang, Guannan Li, Richard van Breemen, Tristesse Burton, and Elisabeth Walker; Back row: Mike Rush, Brian Wright, Daniel Nosek, and Zane Hauck.

## Investiture as the Matthias C. Lu Professor

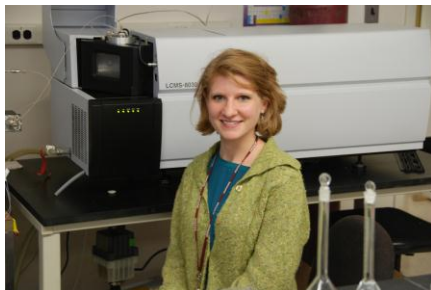
On August 17<sup>th</sup>, 2014, Richard van Breemen was invested as the first Matthias C. Lu Professor of Pharmacy. Matt Lu was a member of the faculty search committee who recruited Richard to UIC in 1993. A member of the Medicinal Chemistry faculty from 1973 until 2010, Matt Lu

received eight Pharmacy and UIC teaching awards. Matt Lu, his wife Mei and son Dan, are pictured (right) with Richard van Breemen at the investiture party held at the Pharmacognosy Field Station. Current lab members Mike Rush and Zane Hauck brewed beer for the event.

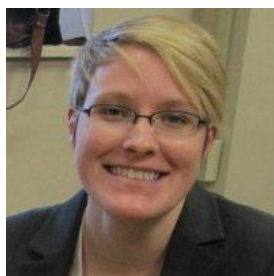


# Lab Member News 2014

## New Postdoctoral Fellows



Dr. Elisabeth Walker joined the lab as a postdoctoral trainee in January 2014. She came to Chicago from Baltimore where she received her Ph.D. in Pharmacology at the Johns Hopkins University with Namandjé Bumpus and the late Robert J. Cotter. Her dissertation concerned mass spectrometric studies of histone post translational modifications and cytochromes P450. Before graduate school, Elisabeth received her BS degree from Wellesley in Neuroscience and Chemistry. Elisabeth is developing MS-based screening assays that will enhance our original pulsed ultrafiltration natural product ligand discovery up to 100-fold.



Dr. Alyssa Sprouse joined the UIC/NIH Botanical Center and our laboratory in September 2014. She received her Ph.D. in Pharmacology and Toxicology from the Indiana University School of Medicine, where she worked with Brittany-Shea Herbert. During her dissertation research, Alyssa investigated how resveratrol enhances the chemotherapeutic action of paclitaxel in resistant breast cancer. Alyssa received her BS in biology from the University of Dayton. At UIC, she is investigating drug-botanical (natural product) interactions.

## Investiture Celebration

The College of Pharmacy held a formal investiture ceremony for the Matthias C. Lu Professorship. Richard van Breemen's family attended including Denise (on faculty at the University of Illinois College of Medicine as well as the Hines VA), and their children Bridget (who had just graduated from Oberlin College as a computer science major), Evan (about to start his junior year at Bradley University, and Megan (about to begin her freshman year at Oberlin College). Also attending were Matt Lu and his wife, Mei, their son Dan Lu (now working in the Medicinal Chemistry and Pharmacognosy office), and their daughter Kathleen and her family.

The entire lab group, the van Breemen and Liu families, UIC faculty and staff, and some of our lab alumni from the Chicago area also gathered for a picnic at the Pharmacognosy Field Station in Downers Grove.

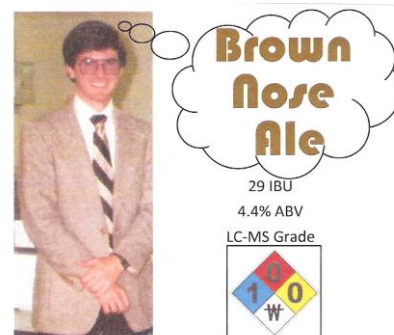
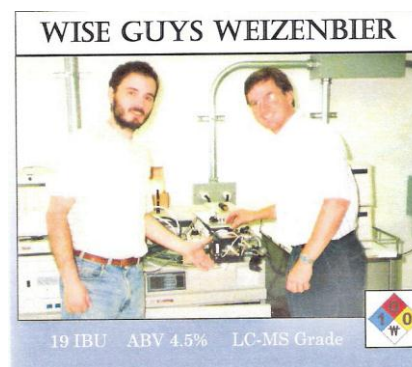
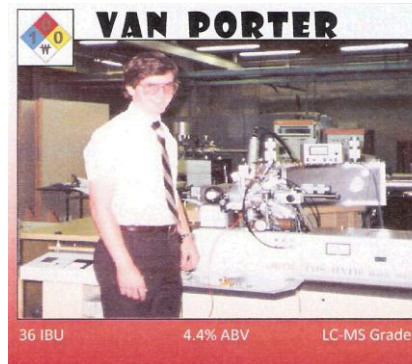


To enrich the festivities, current lab graduate students Mike Rush (Medicinal Chemistry; above) and Zane Hauk (Pharmacognosy; pictured below) brewed three types



of beer and brought them to the investiture reception as well as the picnic. Mike and Zane prepared the

following labels for their brews. We cannot thank Mike and Zane enough for helping to make this event spectacular.



Although we did not know it at the time, our lab party was to be the only event held at the Field Station in 2014. Due to problems with the grounds keeping, the annual Department picnic (Pharmapalooza) was rescheduled at the Molecular Biology Research Building on campus. We hope to return to the Field Station next summer.



## Grants in 2014

1. 2014 marked the 15<sup>th</sup> anniversary of our UIC/NIH Center for Botanical Dietary Supplements Research and our focus remains on supplements used by menopausal women as alternatives to conventional hormone therapy. Guido Pauli leads our pharmacognosy project, Judy Bolton leads the bioassay project, and Richard van Breemen leads the drug-botanical interaction project as well as the entire Center. We worked diligently on a competitive renewal grant application (P50-type) to the NIH

Office of Dietary Supplements and the NIH National Center for Complementary and Integrative Health to fund the Center through 2020. We look forward to good news later in the New Year.

2. Just ending its second year, our NIH training grant (T32AT007533) entitled, "Research training in natural product complementary and alternative medicine," remains the only training grant in the College of Pharmacy. It is currently funding the stipends of 6 graduate students and 3 postdoctoral fellows (two in our lab) in natural products

complementary and alternative medicine.

3. We are also fortunate to be supported by NIH grant R01CA79870. Now in its second year, this grant is supporting our efforts to enhance the throughput of pulsed ultrafiltration mass spectrometry over 100-fold for faster identification of active natural products. This grant is also funding the validation of fast UHPLC-MS/MS assays for the standardization of botanical dietary supplements.

## Awards

1. At the 16<sup>th</sup> Annual College of Pharmacy Graduate Student Awards (part of the 5<sup>th</sup> Research Day) last spring, Pharmacognosy graduate student Andrew Newsome received an Edward Benes Scholarship. Andrew has been working on the natural blue pigment project with Cathy Culver of Pepsico.

2. At the same Awards ceremony, Medicinal Chemistry graduate students Guannan Li and Yongchao Li received W. E. van



Andrew is pictured on the right along with Profs. Jimmy Orjala and van Breemen.

Doren Scholarships. Guannan works on drug-botanical interactions and Yongchao studies prostaglandins and inflammation.



Guannan is standing in the front row center. Yongchao and Prof. van Breemen are behind her.

3. Graduate student Guannan Li was also selected in 2014 for a summer internship at Genentech (South San Francisco, CA).

## Meetings and Seminars

Our group presented 25 talks and posters at national and international meetings in 2014.



Richard speaking at Resveratrol 2014 in Waikoloa, Hawaii.

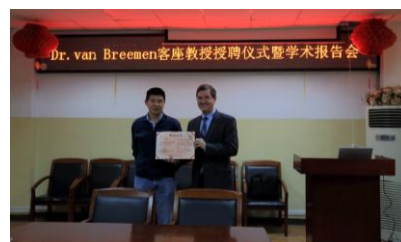
At the 62<sup>th</sup> ASMS Conference in Baltimore, MD, we had 5 presentations. Our group made another 5 presentations at the 55<sup>th</sup> Annual Meeting of the American Pharmacognosy Society in Oxford, MS, and 3 presentations at the MSACL conference in San Diego.

Formerly a visiting scholar to our laboratory and now Associate Professor of the Tongji School of Pharmacy, Huazhong University of Science and Technology in Wuhan, China, Prof. Jinbo Fang hosted Prof. van Breemen's visit to Wuhan in November 2014.



Richard and Jinbo Fang in Wuhan.

Prof. van Breemen presented a seminar and received a Visiting Professor appointment. A gracious host, Prof. Fang showed Prof. van Breemen some of the magnificent sights in and around Wuhan. We plan to continue collaborating with Prof. Fang and his colleagues at the Tongji School of Pharmacy.



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We're on the Web!  
<http://www.uic.edu/labs/breemen/>

## 2014 Publications

Since 1999, our lab has published between 10 and 20 papers per year. Last year, we published 17 peer-reviewed papers, which exceeded our 2013 total of 16 and 2012 total of 15 papers.

1. Yu LF, Brek Eaton J, Zhang HK, Sabath E, Hanania T, Li GN, van Breemen RB, Whiteaker P, Liu Q, Wu J, Chang YC, Lukas RJ, Brunner D, Kozikowski AP. [The potent and selective  \$\alpha 4\beta 2^\*/\alpha 6^\*\$ -nicotinic acetylcholine receptor partial agonist 2-\[5-\[5-\(\(S\)azetidin-2-ylmethoxy\)-3-pyridinyl\]-3-isoxazolyl\]ethanol demonstrates antidepressive-like behavior in animal models and a favorable ADME-tox profile.](#) *Pharmacol Res Perspect.* 2014 Apr;2(2):e00026. doi: 10.1002/prp2.26. Epub 2014 Mar 12.
2. Ramos Alvarenga RF, Friesen JB, Nikolić D, Simmler C, Napolitano JG, van Breemen R, Lankin DC, McAlpine JB, Pauli GF, Chen SN. [K-Targeted metabolomic analysis extends chemical subtraction to DESIGNER extracts: selective depletion of extracts of hops \(\*Humulus lupulus\*\).](#) *J Nat Prod.* 2014; 77:2595-2604.
3. Moyano AL, Li G, Lopez-Rosas A, Månsson JE, van Breemen RB, Givogri MI. [Distribution of C16:0, C18:0, C24:1, and C24:0 sulfatides in central nervous system lipid rafts by quantitative ultra-high-pressure liquid chromatography tandem mass spectrometry.](#) *Anal Biochem.* 2014; 467:31-39.
4. Simmler C, Nikolić D, Lankin DC, Yu Y, Friesen JB, van Breemen RB, Lecomte A, Le Quémener C, Audo G, Pauli GF. [Orthogonal analysis underscores the relevance of primary and secondary metabolites in licorice.](#) *J Nat Prod.* 2014; 77:1806-1816.
5. van Breemen RB, Yuan Y, Banuvar S, Shulman LP, Qiu X, Alvarenga RF, Chen SN, Dietz BM, Bolton JL, Pauli GF, Krause E, Viana M, Nikolic D. [Pharmacokinetics of prenylated hop phenols in women following oral administration of a standardized extract of hops.](#) *Mol Nutr Food Res.* 2014; 58:1962-1969.
6. Newsome AG, Culver CA, van Breemen RB. [Nature's palette: the search for natural blue colorants.](#) *J Agric Food Chem.* 2014; 62:6498-6511.
7. García ME, Nicotra VE, Oberti JC, Ríos-Luci C, León LG, Marler L, Li G, Pezzuto JM, van Breemen RB, Padrón JM, Hueso-Falcón I, Estévez-Braun A. [Antiproliferative and quinone reductase-inducing activities of withanolides derivatives.](#) *Eur J Med Chem.* 2014; 82:68-81.
8. Krause E, Yuan Y, Hajirahimkhan A, Dong H, Dietz BM, Nikolic D, Pauli GF, Bolton JL, van Breemen RB. [Biological and chemical standardization of a hop \(\*Humulus lupulus\*\) botanical dietary supplement.](#) *Biomed Chromatogr.* 2014; 28:729-734.
9. Nikolić D, Li J, van Breemen RB. [Metabolism of Nw -methylserotonin, a serotonergic constituent of black cohosh \(\*Cimicifuga racemosa\*, L. \(Nutt.\)\), by human liver microsomes.](#) *Biomed Chromatogr.* 2014; 28:1647-51.
10. Vandenberg LN, Gerona RR, Kannan K, Taylor JA, van Breemen RB, Dickenson CA, Liao C, Yuan Y, Newbold RR, Padmanabhan V, Vom Saal FS, Woodruff TJ. [A round robin approach to the analysis of bisphenol A \(BPA\) in human blood samples.](#) *Environ Health.* 2014 Apr 1;13(1):25. doi: 10.1186/1476-069X-13-25.
11. Karalius VP, Harbison JE, Plange-Rhule J, van Breemen RB, Li G, Huang K, Durazo-Arvizu RA, Mora N, Dugas LR, Vail L, Tuchman NC, Forrester T, Luke A. [Bisphenol A found in humans and water in 3 geographic regions with distinctly different levels of economic evelopment.](#) *Environ Health Insights.* 2014; 8:1-3.
12. Prins GS, Hu WY, Shi GB, Hu DP, Majumdar S, Li G, Huang K, Nelles JL, Ho SM, Walker CL, Kajdacsy-Balla A, van Breemen RB. [Bisphenol A promotes human prostate stem-progenitor cell self-renewal and increases in vivo carcinogenesis in human prostate epithelium.](#) *Endocrinology.* 2014; 155:805-817.
13. Smith BR, Santos MB, Marshall MS, Cantuti-Castelvetri L, Lopez-Rosas A, Li G, van Breemen R, Claycomb KI, Gallea JI, Celej MS, Crocker SJ, Givogri MI, Bongarzone ER. [Neuronal inclusions of  \$\alpha\$ -synuclein contribute to the pathogenesis of Krabbe disease.](#) *J Pathol.* 2014; 232:509-521.
14. Zhuge Y, Yuan Y, van Breemen R, Degrand M, Holian O, Yoder M, Lum H. [Stimulated bronchial epithelial cells release bioactive lysophosphatidylcholine 16:0, 18:0 & 18:1.](#) *Allergy Asthma Immunol Res.* 2014; 6:66-74.
15. Yoder M, Zhuge Y, Yuan Y, Holian O, Kuo S, van Breemen R, Thomas LL, Lum H. [Bioactive lysophosphatidylcholine 16:0 and 18:0 are elevated in lungs of asthmatic subjects.](#) *Allergy Asthma Immunol Res.* 2014; 6:61-65.
16. Van Loo-Bouwman CA, Naber TH, Minekus M, van Breemen RB, Hulshof PJ, Schaafsma G. [Food matrix effects on bioaccessibility of  \$\beta\$ -carotene can be measured in an in vitro gastrointestinal model.](#) *J Agric Food Chem.* 2014; 62:950-955.
17. Yuan Y, Qiu X, Nikolić D, Chen SN, Huang K, Li G, Pauli GF, van Breemen RB. [Inhibition of human cytochrome P450 enzymes by hops \(\*Humulus lupulus\*\) & hop prenylphenols.](#) *Eur J Pharm Sci.* 2014; 53:55-61.