

PROMOTION RECOMMENDATION
The University of Michigan-Dearborn
College of Arts, Sciences, and Letters

Xiaohua Li, assistant professor of chemistry, Department of Natural Sciences, College of Arts, Sciences, and Letters, is recommended for promotion to associate professor of chemistry, with tenure, Department of Natural Sciences, College of Arts, Sciences, and Letters.

Academic Degrees:

Ph.D.	2008	City University of New York, Organic Chemistry, New York, NY
M.S.	2001	Beijing Institute of Technology, Chemical Engineering, Beijing, P.R. China
B.S.	1998	Tianjin University, Chemistry, Tianjin, P.R. China

Professional Record:

2013 – present	Assistant Professor, Department of Natural Sciences, University of Michigan-Dearborn
2010 – 2013	Visiting Assistant Professor, Department of Chemistry, University of Toledo, OH
2008 – 2010	Post-doctoral Fellow, Department of Chemistry, Columbia University, New York
2001 – 2008	Ph.D. Graduate Research Assistant, City University of New York, New York

Summary of Evaluation:

Teaching: Professor Li is rated excellent in teaching. She is a dedicated educator of Organic Chemistry I, II, Laboratory (CHEM 225, 226, and 227), and recitation sections (CHEM 225R and CHEM 226 R). These courses are required for chemistry majors. Yet 80- 90% of the students are pre-med students majoring in biology, or biochemistry, she has students with diverse goals in mind and, to her credit, she is most accommodating to all the students. She has also taught Advanced Organic Synthesis and Characterization Laboratory (CHEM 450). The Organic Chemistry courses are traditionally known as “tough,” difficult, demanding, and information loaded. Upon each offering of these courses, Professor Li has modified her teaching strategies in response to the students’ evaluations, which has resulted in an increase in the overall evaluation scores of the students over time from 3.65 to 4.32. She demonstrates the exemplary qualities of an excellent teacher as evidenced by students’ comments such as “well prepared,” “approachable,” “passionate about teaching,” “interested in students’ performance,” “caring,” and “wants students to learn.” Professor Li has directed and mentored 12 undergraduate students through Laboratory Research in Chemistry (CHEM499); nine of these student are co-authors on four of her research papers.

Research: Professor Li is rated excellent in research. Her research interests focus on the development and application of new methods for synthesis of organic molecules, specifically, carbohydrates. Carbohydrates, such as glycoproteins, glycopeptides, and oligosaccharides are

important in numerous physiological functions and cellular processes, including fertilization, embryogenesis, neuronal development, immune surveillance, inflammatory reactions, and in disease processes including pathogen infection and tumor metastasis. Carbohydrates are involved in reactions that take place in the endoplasmic reticulum (ER) and Golgi apparatus within cells. One type of the carbohydrates, glycans, combine with an amino acid in a protein and affect the way a protein folds, which in turn affects growth and development of cells into various tissues in the process of glycosylation. Some of these carbohydrates are found in nature. Professor Li has accepted the challenging and labor intensive task of developing methods by which specific natural occurring carbohydrates can be synthesized in the laboratory and used therapeutically for cancer study and treatment. Because some carbohydrate molecules, such as glycoproteins and glycosphingolipids, express themselves abnormally on cancer cell surfaces, Professor Li is examining methods to develop complex carbohydrate molecules which could potentially be used in anticancer vaccines for cancer therapeutic treatment. Tumor-associated carbohydrate antigens are not immunogenic by themselves. They need to be connected to immunogenic carrier proteins in order to activate the immune system to produce corresponding antibodies. In order to synthesize carbohydrate-based antitumor vaccines, Professor Li first prepares complex carbohydrate antigens (oligosaccharides and glycoconjugates) by chemical synthesis and then connects them to the immunogenic carrier proteins. Chemical synthesis of carbohydrate antigens requires new methods for preparation of complex carbohydrate molecules. Development of beta-mannosylation, i.e. the proper connection of the sugar units, is essential in constructing complex carbohydrate antigens and require great synthetic efforts. Similarly, other carbohydrate molecules she has synthesized in her lab can also be used as antibacterial vaccines, when connected with immunogenic carrier proteins, which then kills harmful bacteria. These investigations may provide an alternative approach to the overuse of antibiotics, which can lead to the development of drug resistance bacteria. Professor Li supports her research as a co-PI on a NSF grant for \$390,000 as well as six campus grants from the UM-Dearborn Office of Research and Sponsored Programs.

Recent and Significant Publications:

- Bhetuwal, B. R.; Woodward, J.; Li, X.;* Zhu, J.* “Stereoselective β -Mannosylation via Anomeric O-Alkylation: Concise Synthesis of β -D-Xyl-(1 \rightarrow 2)- β -D-Man-(1 \rightarrow 4)- α -D-Glc- OMe, a Trisaccharide Oligomer of the *Hyriopsis schlegelii* Glycosphingolipid.” *J. Carbohydr. Chem.* 2017, 36, 162-172.
- Zhu, J.; Li, X. “1, 2-Bis(dimethylsilyl)benzene.” e-EROS Encyclopedia of Reagents for Organic Synthesis, 2017, DOI: 10.1002/047084289X.rm02082.
- Zhu, J.; Li, X. “Pentafluorophenyl trifluoroacetate.” e-EROS Encyclopedia of Reagents for Organic Synthesis, 2017, DOI: 10.1002/047084289X.rm02081.
- Li, X.;* Berry, N.; Saybolt, K.; Ahmed, U.; Yuan, Y. “Stereoselective β -Mannosylation via Anomeric O-Alkylation: Formal Synthesis of Potent Calcium Signal Modulator Acremomanolipin A.” *Tetrahedron Lett.* 2017, 58, 2069–2072.
- Li, X.; Zhu, J.* “Glycosylation via Transition-Metal Catalysis: Challenges and Opportunities” *Eur. J. Org. Chem.* 2016, 4724-4767 (Most accessed in 10/2016). *Eur. J. Org. Chem.* 2016, 4719.
- Li, X.;* Woodward, J.; Hourani, A.; Zhu, D.; Ayoub, S.; Zhu, J.* “Synthesis of the 2-Deoxy

- Trisaccharide Glycal of Antitumor Antibiotics Landomycins A and E.” *Carbohydr. Res.* 2016, 430, 54-58.
- Nguyen, H.; Zhu, D.; Li, X.;* Zhu, J.* “Stereoselective Construction of β -Mannopyranosides via Anomeric O-Alkylation: Synthesis of the Trisaccharide Core of N-linked Glycans.” *Angew. Chem., Int. Ed.* 2016, 55, 4767-4771.
- Li, X.; *, Saleh, Z.; Egri, B.; Hourani, A.; Harding, L.; Baryal, K. N.; Zhu, J. “Selective deprotection of benzyl (Bn) ethers in the presence of para-methoxybenzyl (PMB) ethers.” *Tetrahedron Lett.* 2015, 56, 1420-1422.

External Reviewers:

Reviewer A: “In short, Li’s work is nothing short of excellent and within this letter itself I hope to note the potential for upward trajectory for Dr. Li’s future success in your department... Overall, Dr. Li’s work is on par with some of the best faculty in the nation who are studying carbohydrate glycosylation strategies. Her insights into coupling sugars with a heavy emphasis on stereochemistry will surely be important moving forward into the future.”

Reviewer B: “I have thoroughly evaluated Dr. Li’s file and will comment below on what I consider to be a very productive record of high quality research. I [also] should mention that I have always held her commitment to teaching and training students in a very high regard. Moreover, if one considers the quality of the manuscripts to be represented by their respective impact factors, the metrics are even more impressive!”

Reviewer C: “The manuscript describing b-selective mannosylation is clearly outstanding, and will likely soon become a highly cited paper in the field of carbohydrate synthesis. In my view, Dr. Li has achieved significant results and can be favorably compared to some of her peers from the other institutions.”

Reviewer D: “Dr. Li has made tremendous contribution to the field of glycosylation on developing new reactions, and I, like most of the carbohydrate research community, acknowledge Dr. Li’s nationally recognized work.”

Reviewer E: “Compared to her peers working in glycoscience at similar types of institutions, I rank Xiaohua among the top of the group.”

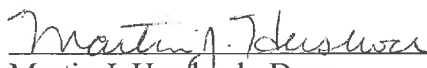
Reviewer F: “My review of Professor Li’s research finds it to be world-class and her to be a committed researcher in the area of organic and carbohydrate chemistry. Professor Li’s contribution to synthetic organic/carbohydrate chemistry to be nothing short of amazing.”

Service: Professor Li is rated significantly capable in service. Professor Li provides important contributions to the Department of Natural Sciences by serving on committees and leading activities to enhance the cultural collegiality on the campus. She has been a member of the Colloquium Committee, the department’s annual Poster Session Committee, and two organic chemistry faculty search committees, as well as performance review committees for LEO lecturers. In connection with her teaching assignments, she conducted an assessment test regarding nomenclature of inorganic compounds as well as four assessment tests in the organic chemistry classes. Her service on the Student Code Appeals Board was appreciated. Her

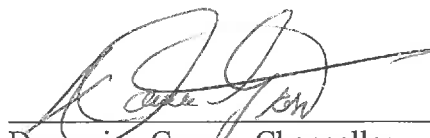
contributions to the organic chemistry profession is well known due to her service as a reviewer of nine manuscripts for five peer-reviewed journals.

Summary of Recommendation:

Professor Li is a talented and accomplished organic chemist, who has demonstrated a deep dedication to student learning. In her research, she has developed new methodologies in synthesizing carbohydrate modules. This work has significant biomedical implications. The lectures and laboratories she teaches serve students from several programs who are going into a variety of fields. She has shown much dedication to student success in this rigorous sequence of courses. She is meticulous and thorough in all aspects of her work, from the time-intensive research she conducts to the various service roles she has fulfilled. She is a good citizen of the department and the profession and shows much promise for productive future as a teacher-scholar. We are very pleased to recommend, with strong support of the College of Arts, Sciences, and Letters Executive Committee, Xiaohua Li for promotion to associate professor of chemistry, with tenure, Department of Natural Sciences, College of Arts, Sciences, and Letters.



Martin J. Hershock, Dean
College of Arts, Sciences, and Letters



Domenico Grasso, Chancellor
University of Michigan-Dearborn

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