



Michèle Auger

Professor
Biophysical Chemistry

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Place and Date of Birth Born in Grand-Mère, Québec, Canada
March 30th, 1963

Academic Background

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|---|---------------------------------------|-----------|
| Postdoctoral Fellow | | 1990-1991 |
| Massachusetts Institute of Technology | | |
| <i>Supervisor</i> : Dr. Robert G. Griffin | | |
| Ph.D. (Chemistry) | University of Ottawa | 1986-1990 |
| <i>Supervisor</i> : Dr. Ian C.P. Smith | | |
| B.Sc. (Chemistry) | Université du Québec à Trois-Rivières | 1982-1985 |

Positions Held - Université Laval

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| Member | CQMF* | 2009-present |
| Member | PROTEO (formerly CREFSIP**) | 2007-present |
| Chair of Undergraduate Studies | Department of Chemistry | 2005-2013 |
| Chair of Graduate Studies | Department of Chemistry | 2004-2005 |
| Acting Chair of Graduate Studies | Department of Chemistry | 2002-2003 |
| Associate Member | CREFSIP | 2000-2007 |
| Full Professor | Department of Chemistry | 2000-present |
| Associate Professor | Department of Chemistry | 1996-2000 |
| Member | CERSIM*** (now CERMA****) | 1991-present |
| Assistant Professor | Department of Chemistry | 1991-1996 |

* CQMF (Quebec Network on Functional Materials)
** PROTEO, CREFSIP (Protein Function, Engineering and Applications Network)
*** CERSIM (Macromolecular Science and Engineering Research Center)
**** CERMA (Advanced Materials Research Center)

Distinctions, Awards and Scholarships

- › Award “Hommage aux innovations sociales”, Attraction chimique, Université Laval, 2014
- › Award for Best Chair of Undergraduate Studies, Université Laval, 2013
- › “ADRIQ Relève Technoscience” Award, Attraction chimique, Université Laval, 2012
- › Professeure étoile (Teaching Award), Faculty of Science and Engineering (FSG), Université Laval, 1999, 2002, 2004, 2005, 2010, 2011, 2012
- › “Best Professor in Chemistry”, FSG, Université Laval, 1997, 2011
- › Nomination, Gala Femmes de mérite, YWCA, Education Category, 2011
- › Fellow of the Chemical Institute of Canada, 2010
- › Women in Science Award, YWCA Quebec Division, Quebec City, 2008
- › Clara Benson Award, Canadian Society for Chemistry, 2007
- › Barringer Award, Spectroscopy Society of Canada, 2002

- › Women's Faculty Award, Natural Sciences and Engineering Research Council of Canada (NSERC), 1991-1996 (250 K\$)
- › Governor General's Gold Medal, Graduate Studies, University of Ottawa, 1990
- › Postdoctoral Fellowship, NSERC, 1990-1991
- › 1967 Science and Engineering Scholarship, NSERC, 1986-1989
- › FCAR PhD Scholarship (declined), 1988-1989
- › FCAR Master Scholarship (declined), 1986-1987
- › Entrance Scholarship, University of Ottawa, 1986-1989
- › Undergraduate Research Scholarship, NSERC, 1984-1985

Membership in Scientific Organizations

- › Member of the Biophysical Society (USA) (since 1988)
- › Member and Treasurer of the Biophysical Society of Canada
- › Member of the Canadian Society for Chemistry
- › Member of ACFAS « Association Francophone pour le Savoir »

Students Supervised and Co-supervised

- › Supervised: 13 PhD students and 34 Master students
- › Co-supervised: 7 PhD students and 12 Master students
- › 12 postdoctoral fellows
- › 3 research professionals
- › 56 undergraduate students
- › 14 international trainees

Research Interests

Study of the structure and dynamics of biological macromolecules by solid-state NMR and vibrational spectroscopy

- › Interaction between novel antimicrobial peptides and model membranes
- › Interaction between amyloid peptides and membranes
- › Study of recombinant and natural spider silk
- › Synthesis and characterization of fluorinated lipids
- › Physicochemical characterization of skin

Participation to Different Committees (last 10 years)

- › Member of the ISMAR (International Society for Magnetic Resonance) Council, 2013-present
- › Member of the Committee on the Prevention of Suicide, Université Laval, 2012-present
- › Member of the IUPAB (International Union of Pure and Applied Biophysics) Council, 2011-present
- › Member of the Editorial Board of *Biophysical Reviews*, 2011-present
- › Member of the Editorial Advisory Board of the *Canadian Journal of Chemistry*, 2009-2012
- › Member of the « Comité paritaire sur le rattachement double » du Syndicat des Professeurs de l'Université Laval, 2009-present
- › Member of the CREPUQ Committee for the evaluation of the PhD program in Chemistry at the Université du Québec à Montréal, 2007
- › Member of the Committee on International Science, Engineering and Technology (CISSET) of the National Research Council, 2003-2008
- › Member of the Steering Committee, National Ultrahigh-Field NMR Facility for Solids, University of Ottawa, National Research Council, 2002-present
- › Member of the Management Committee, Eastern Canada High-Field NMR Facility, University of Montreal and McGill, 2002-2008

Organization of Meetings and Events (Last 10 years)

- › Organizer of the 20th ISMAR Meeting to be held in Quebec City, July 23-28, 2017
- › Co-organizer of the Symposium *Advances in Solid-State NMR of Biological Molecules* at Pacificchem 2015, Honolulu (Hawaii), December 15-20, 2015
- › Student Volunteer Coordinator and Organizer of two symposia, *Canadian Chemistry Conference*, Quebec City, May 26-30, 2013
- › Co-organizer of the *MOOT NMR Minisymposium*, Université Laval, October 20-21, 2012
- › Co-organizer and Treasurer of the event *The 24 Hours of Chemistry* held in the Department of Chemistry at Université Laval, 2006, 2009 and 2012
- › Co-organizer of the exhibit *100 years of Chemistry in Quebec*, Expo Québec Science Pavilion, August 17-28, 2011
- › Co-organizer of the Symposium *Advances in Solid-State NMR of Biological Molecules* at Pacificchem 2010, Honolulu (Hawaii), December 15-20, 2010
- › Co-organizer of the *International Conference on Organized Molecular Films*, LB-13, held in Quebec City, July 19-23, 2010
- › Co-organizer of the event *Les filles et les sciences, un duo électrisant*, Université Laval, February 16th, 2008
- › Co-organizer of exhibits on *Chemistry of Odors*, Expo Québec Science Pavilion, August 15-26, 2007
- › Session Chair, *FASEB Conference on Molecular Biophysics of Cellular Membranes*, Vermont Academy, July 1-6, 2006

Scientific Contributions

- › 109 scientific publications
- › 8 book chapters
- › 3 conference proceedings
- › 105 invited scientific lectures
- › 31 invited outreach lectures
- › 501 communications at scientific meetings

Scientific Publications (Last 6 years)

109. Lefèvre, T., Auger, M., **2015**. *Spider silk-inspired materials and sustainability: a perspective*, Materials Technology: Advanced Performance Materials, accepted.
108. Robert, É., Lefèvre, T., Fillion, M., Martial, B., Dionne, J., Auger, M., **2015**. *Mimicking and understanding the agglutination effect of the antimicrobial peptide thanatin using model phospholipid vesicles*, Biochemistry, 54, 3932-3941.
107. Tremblay, M.-L., Xu, L., Lefèvre, T., Sarker, M., Orrell, K.E., Leclerc, J., Meng, Q., Pézolet, M., Auger, M., Liu, X.-Q., Rainey, J.K., **2015**. *Spider wrapping silk fibre architecture arising from its modular soluble protein precursor*, Sci. Reports, DOI: 10.1038/srep11502.
106. Leroy, M., Lefèvre, T., Pouliot, R., Auger, M., Laroche, G., **2015**. *Using infrared and Raman microspectroscopies to compare ex vivo involved psoriatic skin with normal human skin*, J. Biomed. Opt., DOI:10.1117/1.JBO.20.6.067004.
105. Rhéault, J.-F., Gagné, E., Guertin, M., Lamoureux, G., Auger, M., Lagüe, P., **2015**. *Molecular model of hemoglobin N from Mycobacterium tuberculosis bound to lipid bilayers: a combined spectroscopic and computational study*, Biochemistry, 54, 2073-2084.
104. Huot, A., Lefèvre, T., Rioux-Dubé, J.-F., Nault, A.-P., Auger, M., Pézolet, M., **2015**. *Effect of mechanical deformation on the structure of regenerated B. mori silk fibroin films as revealed by Raman and infrared spectroscopy*, Applied Spectroscopy, 69, 689-698.
103. Ayata, R.E., Chabaud, S., Auger, M., Pouliot, R., **2015**. *Behaviour of endothelial cells in a tridimensional in vitro environment*, BioMed Research International, 630461, DOI: 10.1155/2015/630461.
102. Fillion, M., Auger, M., **2015**. *Oriented samples: a tool for determining the membrane topology and the mechanism of action of cationic antimicrobial peptides by solid-state NMR*, Biophys. Rev., 7, 311-320.

101. Proulx, M., Aubin, K., Lagueux, J., Audet, P., Auger, M., Fortin, M.-A., Fradette, J., **2015**. *Magnetic resonance imaging of human tissue-engineered adipose substitutes*, *Tissue Eng. Part. C.*, 21, 693-704.
 100. Fillion, M., Valois-Paillard, G., Lorin, A., Noël, M., Voyer, N., Auger, M., **2015**. *Membrane interactions of synthetic peptides with antimicrobial potential: Effect of electrostatic interactions and amphiphilicity*, *Probiotics & Antimicro. Prot.*, 7, 66-74.
 99. Gauthier, M., Leclerc, J., Lefèvre, T., Gagné, S.M., Auger, M., **2014**. *Effect of pH on the structure of the recombinant C-terminal domain of Nephila clavipes dragline silk protein*, *Biomacromolecules*, 15, 4447-4454.
 98. Ayata, R.E., Bouhout, S., Auger, M., Pouliot, R., **2014**. *In vitro construction and evaluation of capillarylike structures in psoriatic skin substitutes*, *BioResearch Open Access*, 3, 197-205.
 97. Bédard, L., Lefèvre, T., Morin-Michaud, É., Auger, M., **2014**. *Besides fibrillation: the role of the peptide fragment 71-82 on the structural and assembly behavior of α -synuclein*, *Biochemistry*, 53, 6463-6472.
 96. Gagnon, M.-C., Turgeon, B., Savoie, J.-D., Parent, J.-F., Auger, M., Paquin, J.-F., **2014**. *Evaluation of the effect of fluorination on the property of monofluorinated dimyristoylphosphatidylcholines*, *Org. Biomol. Chem.*, 12, 5126-5135.
 95. Leroy, M., Labbé, J.-F., Ouellet, M., Jean, J., Lefèvre, T., Laroche, G., Auger, M., Pouliot, R., **2014**. *Characterization of healthy human skin substitutes by Raman microspectroscopy*, *Acta Biomater.*, 10, 2703-2711.
 94. Fillion, M., Noël, M., Lorin, A., Voyer, N., Auger, M., **2014**. *Investigation of the mechanism of action of novel amphipatic peptides: Insights from solid-state NMR studies of oriented lipid bilayers*, *Biochim. Biophys. Acta*, 1838, 2173-2179.
 93. Potvin-Fournier, K., Lefèvre, T., Picard-Lafond, A., Valois-Paillard, G., Cantin, L., Salesse, C., Auger, M., **2014**. *The thermal stability of recoverin depends on calcium binding and its myristoyl moiety as revealed by infrared spectroscopy*, *Biochemistry*, 53, 48-56.
 92. Leroy, M., Lafleur, M., Auger, M., Laroche, G., Pouliot, R., **2013**. *Characterization of the structure of human skin substitutes by infrared microspectroscopy*, *Anal. Bioanal. Chem.*, 405, 8709-8718.
 91. Leclerc, J., Lefèvre, T., Gauthier, M., Gagné, S., Auger, M., **2013**. *Hydrodynamical properties of recombinant spider silk proteins: Effects of pH, salts and shear, and implications for the spinning process*, *Biopolymers*, 99, 582-593.
 90. Otis, F., Auger, M., Voyer, M., **2013**. *Exploiting peptide nanostructures to construct functional artificial ion channels*, *Acc. Chem. Res.*, 46, 2934-2943.
 89. Labbé, J.-F., Lefèvre, T., Guay-Bégin, A.-A., Auger, M., **2013**. *Structure and membrane interactions of the β -amyloid fragment 25-35 as viewed by spectroscopic approaches*, *Phys. Chem. Chem. Phys.*, 15, 7228-7239.
 88. Paquet-Mercier, F., Lefèvre, T., Auger, M., Pézolet, M., **2013**. *Evidences by infrared spectroscopy of the presence of two types of β -sheets in major ampullate spider silk and silkworm silk*, *Soft Matter*, 9, 208-215.
 87. Lorin, A., Noël, M., Provencher, M.-E., Turcotte, V., Cardinal, S., Lagüe, P., Voyer, N., Auger, M., **2012**. *Determining the mode of action involved in the antimicrobial activity of synthetic peptides from FTIR and solid-state NMR experiments*, *Biophys. J.*, 103, 1470-1479.
 86. Leclerc, J., Lefèvre, T., Pottier, F., Morency, L.-P., Lapointe-Verreault, C., Gagné, S., Auger, M., **2012**. *Structure and pH-induced alterations of recombinant and natural spider silk proteins in solution*, *Biopolymers*, 97, 337-346.
 85. Guimond-Tremblay, J., Turcotte, V., Gagnon, M.-C., Auger, M., Paquin, J.-F., **2012**. *Synthetic and properties of monofluorinated dimyristoylphosphatidylcholine derivatives: Potential fluorinated probes for the study of membrane topology*, *Org. Biomol. Chem.*, 10, 1145-1148.
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84. Lorin, A., Noël, M., Provencher, M.-E., Turcotte, V., Masson, C., Cardinal, S., Lagüe, P., Voyer, N., Auger, M., **2011**. *Revisiting peptide amphiphilicity for membrane pore formation*, *Biochemistry*, 50, 9409-9420 (this manuscript has been highlighted by the journal).
83. Cloutier, I., Leclerc, J., Lefèvre, T., Auger, M., **2011**. *Solid-state NMR spectroscopy reveals distinctive protein dynamics in closely-related spider silks*, *Can. J. Chem.*, 89, 1047-1054.
82. Thibeault, D., Auger, M., Morin, J.-F., **2010**. *Synthesis of fluorine-containing molecular rotors and their assembly on gold nanoparticles*, *Eur. J. Org. Chem.*, 3049-3067.
81. Ouellet, M., Voyer, N., Auger, M., **2010**. *Membrane interactions and dynamics of a 21-mer cytotoxic peptide: A solid-state NMR study*, *Biochim. Biophys. Acta*, 1798, 235-243.
80. Cloutier, I., Paradis-Bleau, C., Giroux, A.-M., Pigeon, X., Arseneault, M., Levesque, R.C., Auger, M., **2010**. *Biophysical studies of the interactions of the phage ϕ KZ gp144 lytic transglycosylase with model membranes*, *Eur. Biophys. J.*, 39:263-276.
79. Giguère, J.-B., Thibeault, D., Cronier, F., Marois, J.-S., Auger, M., Morin, J.-F., **2009**. *Synthesis of [2]- and [3]rotaxanes through Sonogashira coupling*, *Tet. Lett.*, 50, 5497-5500.
78. Labbé, J.-F., Cronier, F., C.-Gaudreault, R., Auger, M., **2009**. *Spectroscopic characterization of DMPC/DOTAP cationic liposomes and their interaction with DNA and drugs*, *Chem. Phys. Lipids*, 159, 91-101.

Book Chapters

8. Lefèvre, T., Byette, F., Marcotte, I., Auger, M., **2014**. *Protein- and peptide-based materials: a source of inspiration for innovation*, in "Textbook on Functional Organic Materials", R. Gauvin and M. Leclerc, Eds., De Gruyter, pp 415-442.
7. Fillion, M., Voyer, N., Auger, M., **2014**. *Membrane interactions of amphiphilic peptides with antimicrobial potential: A solid-state NMR study*, in "Advances in Biological Solid-State NMR: Proteins and Membrane-Active Peptides", F. Separovic and A. Naito, Eds., Royal Society of Chemistry, Cambridge, UK, pp 200-213.

Article Promoting Research Project

1. Pouliot M., Auger, M., **2012**. *The reconstruction of psoriatic skin*, *International Innovation, Healthcare Issue* 16, 76-78.

Invited Scientific Talks (last 6 years)

104. 98th Canadian Chemical Society Conference and Exhibition, Ottawa (Ontario), June 15, **2015**.
103. INRS-Institut Armand-Frappier, Laval (Québec), August 7, **2014**.
102. Atomic View of Biomolecular Function Symposium, University of Michigan, Ann Arbor (Michigan), July 11-13, **2013** (could not attend due to illness).
101. 8th Annual Solid-State NMR Workshop, National Ultrahigh Field NMR Facility for Solids, Québec (Québec), May 26, **2013**.
100. Département de chimie, Université du Québec à Montréal, Montréal (Québec), February 22, **2013**.
99. Department of Chemistry, Hamilton College, Clinton (New York), October 26, **2012**.
98. 95th Canadian Chemical Society Conference and Exhibition, Calgary (Alberta), May 28, **2012**.
97. 95th Canadian Chemical Society Conference and Exhibition, Calgary (Alberta), May 28, **2012**.
96. Defence Research and Development Canada, Valcartier, May 16, **2012**.
95. 15th GEM (Groupe d'étude sur les membranes) Congress, Paris (France), April 4, **2012**.
94. 79^e Congrès de l'Acfas, Université de Sherbrooke, May 12, **2011**.
93. Department of Chemistry, Université de Montréal, Montréal (Québec), March 31, **2011**.
92. R.G. Griffin Reunion, Massachusetts Institute of Technology, Cambridge (MA), January 21, **2011**.
91. Pacificchem 2010, Honolulu (Hawaii), December 16, **2010**.
90. Institut Européen de Chimie et Biologie, Université Bordeaux I, Bordeaux (France), October 29, **2010**.

89. Rocky Mountain Conference on Analytic Chemistry, Snowmass (Colorado), August 4, **2010**.
 88. Dep. Chemistry and Biochemistry, University of Windsor, Windsor, November 20, **2009**.
 87. 92th Canadian Chemical Society Conference and Exhibition, Hamilton, June 1, **2009**.
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