

Peter M. Tessier

Albert M. Mattocks Professor

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EDUCATION

- 2003 **Ph.D., Chemical Engineering** University of Delaware
 Dissertation: “*Fundamentals and applications of nanoparticle interactions and self-assembly*”
 Advisors: Abraham M. Lenhoff and Stanley I. Sandler
- 1998 **B.S., Chemical Engineering** University of Maine
 Co-Valedictorian

PROFESSIONAL EXPERIENCE

- 2017-present **Albert M. Mattocks (Endowed) Professor**
University of Michigan, Departments of Pharmaceutical Sciences, Chemical Engineering and Biomedical Engineering, Biointerfaces Institute
- 2016-2017 **Richard Baruch M.D. Career Development (Endowed) Professor**
Rensselaer Polytechnic Institute, Department of Chemical & Biological Engineering, Center for Biotechnology & Interdisciplinary Studies
- 2014-2016 **Richard Baruch M.D. Career Development (Endowed) Associate Professor**
Rensselaer Polytechnic Institute, Department of Chemical & Biological Engineering, Center for Biotechnology & Interdisciplinary Studies
- 2014-2015 **Alexander von Humboldt Fellow**
Max Planck Institute for Biochemistry (Martinsried, Germany)
 Host: F. Ulrich Hartl
- 2013-2016 **Associate Professor**
Rensselaer Polytechnic Institute, Department of Chemical & Biological Engineering, Center for Biotechnology & Interdisciplinary Studies
 *granted early tenure (December 2012, promotion effective July 2013)
- 2007-2013 **Assistant Professor**
 Rensselaer Polytechnic Institute, Department of Chemical & Biological Engineering,
 Center for Biotechnology & Interdisciplinary Studies
- 2003-2007 **American Cancer Society Postdoctoral Fellow**
Whitehead Institute for Biomedical Research (MIT)
 Advisor: Susan Lindquist

ACADEMIC HONORS

- 2018 Fellow, American Institute for Medical and Biological Engineering
- 2016 Young Investigator Award, Biochemical Engineering Journal (Dublin, Ireland)
- 2015 Invited participant, USA National Academy of Engineering Frontiers of Engineering Symposium
- 2015 Young Investigator Award, Division of Biochemical Technology, American Chemical Society
- 2014 Young Scientist Award, World Economic Forum (Tianjin, China)

2014-2015	Alexander von Humboldt Fellowship for Experienced Researchers
2010-2015	National Science Foundation CAREER Award
2010-2014	Pew Scholar Award in Biomedical Sciences
2014	Rensselaer Dept. of Chemical & Biological Engineering Teaching Award
2013	Rensselaer School of Engineering Teaching Excellence Award
2012	Rensselaer Early Career Award
2012	Rensselaer School of Engineering Research Excellence Award
2012	Allan P. Colburn Lectureship, Univ. of Delaware
2004-2007	American Cancer Society Postdoctoral Fellowship
2004	National Institutes of Health Postdoctoral Fellowship (declined)
2002	W.H. Peterson Award, Best Student Presentation (BIOT), ACS National Meeting
2002	First Place, Colorado Protein Stability Conference Poster Session
2001	Teaching Fellow, Dept. of Chemical Eng., Univ. of Delaware
2001	Pigford Teaching Assistant Award, Dept. of Chemical Eng., Univ. of Delaware
2000	Semi-Finalist, Discover Magazine Award for Technological Innovation
1999-2002	NASA Graduate Fellowship
1998	Co-Valedictorian, Univ. of Maine

PATENTS

Lindquist S.L., Krishnan R., Tessier P.M., “Devices from prion-like proteins”, US Patent 11/916,983 (2009).

BOOK CHAPTERS

Tessier P.M., Lindquist S.L., “Unraveling molecular mechanisms and structures of self-perpetuating prions”, in *Protein Misfolding Diseases: Current and Emerging Principles and Therapies*, John Wiley & Sons. Dobson, C.M., Kelly, J.W. and Ramirez-Alvarado, M. Eds., (2010).

JOURNAL PUBLICATIONS [64 published papers or papers in press, *=corresponding author, †=undergraduate student, [] = number of citations as of 9/2020, 4472 citations total (Google Scholar), average of 70 citations per paper, h-index=32 (Google Scholar)]

1. Sawant, M.S., Streu, C.N., Wu, L., Tessier, P.M., *, “Toward drug-like multispecific antibodies by design”, *in review* (2020).
2. Desai, A.A., Smith, M.D., Zheng, Y., Makowski, E.K., Gerson, J.E., Ionescu, E., Starr, C.G., Paulson, H.L., Tessier, P.M., * “Rational affinity maturation of anti-amyloid antibodies with high conformational and sequence specificity”, *in review* (2020).
3. Lou, W., Stimple, S.D., Desai, A.A., Makowski, E.K., Kalyoncu, S., Mogensen, J.E., Spang, L.T., Asgreen, D.J., Staby, A., Duus, K., Amstrup, J., Tessier, P.M., * “Directed evolution of conformation-specific antibodies for sensitive detection of polypeptide aggregates in therapeutic drug formulations”, *in review* (2020).
4. Zhang, Y., Wu, L., Gupta, P., Desai, A.A., Smith, M.D., Rabia, L.A., Ludwig, S.D., † Tessier, P.M., * “Physicochemical rules for identifying monoclonal antibodies with drug-like specificity”, *Mol Pharm*, **17**, 7 (2020).
5. Alam, M.E., Slaney, T.R., Wu, L., Das, T.K., Kar, S., Barnett, G.V., Leone, A., Tessier, P.M., * “Unique impacts of methionine oxidation, tryptophan oxidation and asparagine deamidation on antibody stability and aggregation”, *J Pharm Sci*, **109**, 656 (2020). [4]
6. Stimple, S.D., Smith, M.S., Tessier, P.M., * “Directed evolution methods for overcoming trade-offs between protein activity and stability”, *AIChE J*, **66**, e16814 (2020). † [4]
†Special Issue in honor of Frances Arnold’s Nobel Prize
7. Lee, C.-H., Kang, T.H., Godon, O., Watanabe, M., Delidakis, G., Gillis, C.M., Sterlin, D., Hardy, D., Cogné, M., Macdonald, L.E., Murphy, A.J., Tu, N., Lee, J., McDaniel, J.R., Makowski, E.K.,

- Tessier, P.M., Meyer, A.S., Bruhns, P.,* Georgiou, G.,* “An engineered, pH-toggle switch, human Fc domain for ultra-long circulation persistence”, *Nat. Commun.*, **10**, 5031 (2019). [5]
8. Stimple, S.D., Kalyoncu, S., Desai, A.D., Mogensen, J.E., Spang, L.T., Asgreen, D.J., Staby, A., Tessier, P.M.,* “Sensitive detection of glucagon aggregation using amyloid fibril-specific antibodies”, *Biotech Bioeng*, **116**, 1868 (2019). [1]
 9. Julian, M.C., Rabia, L.A., Desai, A.A., Arsiwala, A., Gerson, J.E., Paulson, H.L., Kane, R.S., Tessier, P.M.,* “Nature-inspired design and evolution of anti-amyloid antibodies”, *J Biol Chem*, **294**, 8438 (2019). [3]
 10. Alam, M.E., Barnett, G.V., Slaney, T.R., Starr, C.G., Das, T.K., Tessier, P.M.,* “Deamidation can compromise antibody colloidal stability and enhance aggregation in a pH-dependent manner”, *Mol Pharm*, **16**, 1939 (2019). [5]
 11. Starr, C.G., Tessier, P.M.,* “Selecting and engineering monoclonal antibodies with drug-like specificity”, *Current Opin Biotech*, **60**, 119 (2019). [8]
 12. Rabia, L.A. Zhang, Y., Ludwig, S.D., Julian, M.C., Tessier, P.M.,* “Net charge of the complementarity-determining regions is a key predictor of antibody specificity”, *Protein Eng Des Sel*, **31**, 409 (2018). [14]
 13. Rabia, L.A., Desai, A.A., Jhajj, H.S., Tessier, P.M.,* “Understanding and overcoming trade-offs between antibody affinity, specificity, stability and solubility”, *Biochem. Eng. J.*, **137**, 365 (2018). [22]
 14. Alam, M.E., Geng, S.B., Bender, C., Ludwig,† S.D., Linden, L., Hoet, R., Tessier, P.M.,* “Biophysical and sequence-based methods for identifying monovalent and bivalent antibodies with high colloidal stability”, *Mol Pharm*, **15**, 150 (2018). [11]
 15. Tiller, K.E., Li, L., Kumar, S., Julian, M.C., Garde, S., Tessier, P.M.,* “Arginine mutations in antibody complementarity-determining regions display context-dependent affinity/specificity trade-offs”, *J Biol Chem*, **292**, 16638 (2017). [21]
 16. Tiller, K.E., Chowdhury, R., Li, T., Ludwig, S.,† Sen, S.,† Maranas, C., Tessier, P.M.,* “Facile affinity maturation of antibody variable domains using natural diversity mutagenesis”, *Front Immunol*, **8**, 986 (2017). [22]
 17. Julian, M.C., Li, L., Garde, S., Wilen, R.,† Tessier, P.M.,* “Efficient affinity maturation of antibody variable domains requires co-selection of compensatory mutations to maintain thermodynamic stability”, *Sci Rep*, **7**, 45259 (2017). [42]
 18. Zhao, J., Huvent, I., Lippens, G., Eliezer, D., Zhang, A., Li, Q., Tessier, P.M., Linhardt, R.J., Zhang, F., Wang, C.,* “Glycan determinants of heparin-tau interaction,” *Biophys J*, **112**, 921 (2017). [30]
 19. Nilvebrant, J.,* Tessier, P.M., Sidhu, S.S., “Engineered autonomous human variable domains”, *Curr Pharm Des*, **22**, 1 (2016). [15]
 20. Geng, S.B., Wu, J., Alam, M.E., Schultz, J.S., Dickinson, C.D., Seminar, C.R.,† Tessier, P.M.,* “Facile preparation of stable antibody-gold conjugates and application to affinity-capture self-interaction nanoparticle spectroscopy”, *Bioconjug Chem*, **27**, 2287 (2016). [11]
 21. Geng, S.B., Wittekind, M., Vigil, A. Tessier, P.M.,* “Measurements of monoclonal antibody self-association are correlated with complex biophysical properties”, *Mol Pharm*, **13**, 1636 (2016). [18]
 22. Osborne, D.M., Fitzgerald, D.P., O’Leary, K.E., Anderson, B.M., Lee, C.C., Tessier, P.M., McNay, E.C.,* “Intrahippocampal administration of a domain antibody that binds aggregated amyloid- β reverses cognitive deficits produced by diet-induced obesity”, *Biochim Biophys Acta*, **1860**, 1291 (2016). [9]
 23. Lee, C.C., Julian, M.C., Tiller, K.E., Meng, F., DuConge, S.E.,† Akter, R., Raleigh, D.P., Tessier, P.M.,* “Design and optimization of anti-amyloid domain antibodies specific for A β and IAPP”, *J Biol Chem*, **291**, 2858 (2016). [31]
 24. Tiller, K.E., Tessier, P.M.,* “Advances in antibody design”, *Ann Rev Biomed Eng*, **17**, 191 (2015). [99]

25. Julian, M.C., Lee, C.L., Tiller, K.E., Rabia, L.A., Day, E.K.,[†] Schick III, A.J.,[†] Tessier, P.M.,* “Co-evolution of affinity and stability of grafted amyloid-motif domain antibodies”, *Protein Eng Des Sel*, **28**, 339 (2015). [20]
26. Wu, J., Schultz, J.S., Weldon, C.L., Sule, S.V., Chai, Q., Dickinson, C.D.,* Tessier, P.M.,* “Discovery of highly soluble antibodies prior to purification using affinity-capture self-interaction nanoparticle spectroscopy”, *Protein Eng Des Sel*, **28**, 403 (2015). [17]
27. McBride, S.A., Tilger, C.F., Sanford, S.P., Tessier, P.M., Hirs, A.H.,* “Comparison of human and bovine insulin amyloidogenesis under uniform shear”, *J Phys Chem B*, **119**, 10426 (2015). [15]
28. Estep, P., Caffry, I., Yu, Y., Sun, T., Cao, Y., Leanaugh, H., Jain, T., Vásquez, M., Tessier, P.M., Xu, Y.,* “An alternative assay to hydrophobic interaction chromatography for high-throughput characterization of monoclonal antibodies”, *mAbs*, **4**, 553 (2015). [24]
29. Li, X., Geng, S.B., Chiu, M.L., Saro, D., Tessier, P.M.,* “High-throughput assay for measuring monoclonal antibody self-association and aggregation in serum”, *Bioconjug Chem*, **26**, 520 (2015). [9]
30. Geng, S.B., Cheung, J.K., Narasimhan, C., Shameem, M., Tessier, P.M.,* “Improving monoclonal antibody selection and engineering using measurements of colloidal protein interactions”, *J Pharm Sci*, **103**, 3356 (2014). [44]
31. Jayaraman, J., Wu, J., Brunelle,[†] M.C., Cruz, A.M., Goldberg, D.S., Lobo, B., Shah, A., Tessier, P.M.,* “Plasmonic measurements of monoclonal antibody self-association using self-interaction nanoparticle spectroscopy”, *Biotech Bioeng*, **11**, 1513 (2014). [27]
32. Tessier, P.M.,* Wu, J., Dickinson, C.G., “Emerging methods for identifying monoclonal antibodies with low propensity to self-associate during the early discovery process”, *Expert Opin Drug Deliv*, **11**, 461 (2014). [22]
33. Perchiacca, J.M., Lee, C.C., Tessier, P.M.,* “Optimal charged mutations in the complementarity-determining regions that prevent domain antibody aggregation are dependent on the antibody scaffold”, *Protein Eng Des Sel*, **27**, 29 (2014). [58]
34. Liu, Y., Caffry, I., Wu, J., Geng, S.B., Jain, T., Sun, T., Reid, F., Cao, Y., Estep, P., Yu, Y., Vásquez, M., Tessier, P.M., Xu, Y.,* “High-throughput screening for developability during early-stage antibody discovery using self-interaction nanoparticle spectroscopy”, *mAbs*, **6**, 483 (2014). [56]
35. Li, X., Zhang, X., Ladiwala, A.R.A., Du, D., Yadav, J.K., Tessier, P.M., Wright, P.E., Kelly, J.W., Buxbaum, J.N.,* “Mechanisms of transthyretin inhibition of A β aggregation in vitro”, *J Neurosci*, **33**, 19423 (2013). [85]
36. Andersson, E.K., Bengtsson, C., Evans, M.L., Chorell, E., Sellstedt, M., Lindgren, A.E.G., Hufnagel, D.A., Bhattacharya, M., Tessier, P.M., Wittung-Stafshede, P., Almqvist, F.,* Chapman, M.R.,* “Modulation of curli assembly and pellicle biofilm formation by chemical and protein chaperones”, *Chem Biol*, **20**, 1245 (2013). [52]
37. Lee, C., Perchiacca, J.M., Tessier, P.M.,* “Toward aggregation-resistant antibodies by design”, *Trends Biotechnol*, **31**, 612 (2013). [79]
38. Tiller, K.E., Tessier, P.M.,* “Lifting the veil on amyloid drug design”, *eLife*, **2**, e00857 (2013). [4]
39. Sule, S.V., Dickinson, C.G., Lu, J., Chow, C.-K., Tessier, P.M.,* “Rapid analysis of antibody self-association in complex mixtures using immunogold conjugates”, *Mol Pharm*, **10**, 1322 (2013). [41]
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41. Perchiacca, J.M., Ladiwala, A.R.A., Bhattacharya, M., Tessier, P.M.,* “Aggregation-resistant domain antibodies engineered with charged mutations near the edges of the complementarity-determining regions”, *Protein Eng Des Sel*, **12**, 591 (2012). [101]

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43. Ladiwala, A.R, Perchiacca, J.M., Fishman, Z.S.,[†] Bhattacharya, M., Domigan, B.,[†] Dordick, J.S., Tessier, P.M.,* “Polyphenolic disaccharides endow proteins with unusual resistance to aggregation”, *Biotech Bioeng*, **109**, 1869 (2012). [11]
44. Perchiacca, J.M., Tessier, P.M.,* “Engineering aggregation-resistant antibodies”, *Ann Rev Chem Biomol Eng*, **3**, 263 (2012). [106]
45. Sule, S.V., Cheung, J., Antochshuk, V., Bhalla, A., Narasimhan, C., Blaisdell, S., Shameem, M., Tessier, P.M.,* "Solution pH that minimizes self-association of three monoclonal antibodies is strongly dependent on ionic strength", *Mol Pharm*, **9**, 744 (2012). [48]
46. Perchiacca, J.M., Ladiwala, A.R.A, Bhattacharya, M.B., Tessier, P.M.,* "Structure-based design of conformation- and sequence-specific antibodies against amyloid β ", *P Natl Acad Sci U S A*, **109**, 84 (2012). [112]
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51. Perchiacca, J.M., Bhattacharya, M., Tessier, P.M.,* “Mutational analysis of domain antibodies reveals aggregation hotspots within and near the complementarity determining regions”, *Proteins*, **79**, 2637 (2011). [93]
52. Ladiwala, A.R, Dordick, J.S., Tessier, P.M.,* “Aromatic small molecules remodel toxic soluble oligomers of amyloid A β through three unique pathways”, *J Biol Chem*, **286**, 3209 (2011). [160]
53. Ladiwala, A.R, Lin, J.C., Bale, S.S., Marcelino-Cruz, A.M., Bhattacharya, M., Dordick, J.S., Tessier, P.M.,* “Resveratrol selectively remodels soluble oligomers and fibrils of amyloid A β into off-pathway conformers”, *J Biol Chem*, **285**, 24228 (2010). [265]
54. Tessier, P.M.,* Lindquist, S.,* “Unraveling infectious structures, strain variants and species barriers for the yeast prion [PSI⁺]”, *Nature Struct Mol Biol*, **16**, 598 (2009). [88]
55. Bengali, A.N., Tessier, P.M.,* “Biospecific immobilization of proteins for rapid analysis of weak protein interactions using self-interaction nanoparticle spectroscopy”, *Biotechnol Bioeng*, **104**, 240 (2009). [12]
56. Tessier, P.M.,* Jinkoji, J., Cheng, Y.C., Prentice, J.L., Lenhoff, A.M., “Self-interaction nanoparticle spectroscopy: A nanoparticle-based protein interaction assay”, *J Am Chem Soc*, **130**, 3106 (2008). [62]
57. Tessier P.M., Lindquist S.,* “Prion recognition elements govern nucleation, strain specificity and species barriers”, *Nature*, **447**, 557 (2007).[†] [144]
[†]See accompanying commentaries in *Nature*, **447**, 541(2007), *Nat Methods*, **4**, 538 (2007) & *J Cell Biol*, **177**, 747 (2007).
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59. Tessier, P.M., Johnson, H.R., Pazhianur, R., Berger, B.W., Prentice, J.L., Bahnson, B.J., Sandler, S.I., Lenhoff, A.M.,* “Predictive crystallization of ribonuclease A via rapid screening of osmotic second virial coefficients,” *Proteins*, **50**, 303 (2003). [86]

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