

Julien Roche, Ph.D.

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Academic appointment

- *Assistant Professor*: Iowa State University, BBMB Department, Ames, IA, USA 2016-

Postdoctoral training

- *Postdoctoral Fellow*: The National Institutes of Health, NIDDK. Bethesda, MD, USA 2012-2016
Supervision: Dr. Ad Bax.

Education

- Ph.D. in the Centre de Biochimie Structurale (Montpellier, France) 2008-2012
Supervision: Prof. Christian Roumestand and Prof. Catherine Royer.
- Master degree in Biophysics (University of Montpellier II, France) 2006-2008
- Bachelor of Sciences, Biophysics (University of Montpellier II, France) 2003-2006

Other positions:

- *Teaching assistant*: Biophysics for Master students. University of Montpellier II, France. 2010
1/4 TA time equivalent for one semester
- *Teaching assistant*: Physics and Chemistry for undergraduate students. IUT of Montpellier, France. 2009
1/2 TA time equivalent for one academic year

Funding and awards:

- *Young researcher award from the French Biophysical Society* 2014
- *Intramural AIDS Research Fellowship* renewal (one-year funding) 2014
- *Intramural AIDS Research Fellowship* (one-year funding) 2013
- *Fellows Award for Research Excellence* (travel grant) 2013
- *Fulbright grant* for a 6 months stay in Prof. Angel E. Garcia's lab (RPI, NY.) 2011
- *Grant for Excellency* from University of Montpellier II, France. 2007

Professional membership:

- *Biophysical Society* 2012-
- *AAAS* 2016-

Publications:

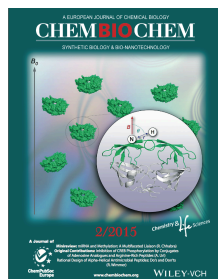
26. Roche J, Royer C.A, Roumestand C. (2017) Monitoring protein folding through high pressure NMR. **Progress in Nuclear Magnetic Resonance Spectroscopy** (in press)
25. Luan M, Nguyen, Roche J.* (2017) High-pressure NMR techniques for the study of protein dynamics, folding and aggregation. **J. Magn. Reson.** 277: 179-185 *corresponding author ©
24. Agniswamy J, Louis J.M, Roche J, Harrison R.W, Weber I.T (2016) Structural studies of a rationally selected multi-drug resistant HIV-1 protease reveal synergistic effect of distal mutations on flap dynamics. **PLoS One.** 11: e0168616
23. Louis J.M, Baber J.L, Ghirlando R, Aniana A, Bax A, Roche J.* (2016) Insights into the conformation of the membrane proximal regions critical to the trimerization of the HIV-1 gp41 ectodomain bound to dodecyl phosphocholine micelles. **PLoS One.** 11: e0160597 *corresponding author
22. Louis J.M, Roche J.* (2016) Evolution under drug pressure remodels the folding free-energy landscape of mature HIV-1 protease. **J. Mol. Biol.** 428: 2780-2792 *corresponding author
21. Roche J, Ying J, Shen Y, Torchia D.A, Bax A. (2016) ARTSY-J: convenient and precise measurement of $^3J_{\text{HNH}\alpha}$ couplings in medium-size proteins from TROSY-HSQC spectra. **J. Magn. Reson.** 268: 73-81
20. Roche J, Shen Y, Jung Ho L, Jinfa Y, Bax A. (2016) Monomeric $A\beta^{1-40}$ and $A\beta^{1-42}$ peptides in solution adopt very similar ramachandran map distributions that closely resemble random coil. **Biochemistry** 55: 762-775
19. Roche J, Ying J, Bax A. (2015) "Accurate measurement of $^3J_{\text{HNH}\alpha}$ couplings in small or disordered proteins from WATERGATE-optimized TROSY spectra". **J. Biomol. NMR** 64: 1-7
18. Roche J, Louis J.M, Bax A, Best R. (2015) "Pressure-induced structural transition of mature HIV-1 Protease from a combined NMR/MD simulation approach". **Proteins.** 83: 2117-2123
17. Tugarinov V, Libich D.A, Meyer V, Roche J, Clore G.M. (2015) "The energetics of a three-state protein folding system probed by high-pressure relaxation NMR from 1 to 2500 bar". **Angew. Chem. Int. Ed.** 54: 11157-11161
16. Dellarole M, Caro J.A, Roche J, Fossat M, Barthe P, Garcia-Moreno B, Royer C.A, Roumestand C (2015) "Evolutionary conserved pattern of interactions in a protein revealed by local thermal expansion properties". **J. Am. Chem. Soc.** 137: 9354-9362
15. Roche J, Louis J.M, Aniana A, Ghirlando R, Bax A. (2015) Complete dissociation of the HIV-1 gp41 ectodomain and membrane proximal regions upon phospholipid binding. **J. Biomol. NMR** 61: 235-248
14. Roche J, Louis J.M, Bax A. (2014) Conformation of inhibitor-free HIV-1 protease derived from NMR spectroscopy in a weakly oriented solution. **ChemBiochem.** 16: 214-218 ©
13. Louis J.M, Aniana A, Lohith K, Sayer J.M, Roche J, Bewley C.A, Clore G.M. (2014) Binding of HIV-1 gp41-directed neutralizing and non-neutralizing fragment antibody binding domain (Fab) and single chain variable fragment (ScFv) antibodies to the ectodomain of gp41 in the pre-hairpin and six-helix bundle conformations. **PLoS One.** 9: e104683

12. Maltsev A.S, Grishaev A, **Roche J**, Zasloff M, Bax A. (2014) "Improved cross validation of a static ubiquitin structure derived from high precision residual dipolar couplings measured in a drug-based liquid crystalline phase". **J. Am. Chem. Soc.** 136: 3752-3755
11. **Roche J**, Louis J.M, Grishaev A, Ying J, Bax A. (2014) "Dissociation of the trimeric gp41 ectodomain at the lipid-water interface suggests an active role in HIV-1 Env-mediated membrane fusion". **Proc. Natl. Acad. Sci. USA.** 111: 3425-3430
10. Ying J, **Roche J**, Bax A. (2013) "Homocoupling for enhancing resolution and sensitivity in NOE and RDC measurements of peptides and proteins". **J. Magn. Reson.** 241: 97-102
9. Louis. J.M, Tozser J, **Roche J**, Matuz K, Aniana A, Sayer J.M. (2013) "Enhanced stability of monomer fold correlates with extreme drug resistance of HIV-1 Protease". **Biochemistry** 52: 7678-7688
8. **Roche J**, Dellarole M, Caro J.A, Norberto D.E, Garcia A.E, Garcia-Moreno B, Roumestand C, Royer C.A. (2013) "Effect of internal cavities on folding rates and routes revealed by real-time pressure-jump NMR spectroscopy". **J. Am. Chem. Soc.** 135: 14610-14618
7. **Roche J**, Ying J, Maltsev A.S, Bax A. (2013) "Impact of hydrostatic pressure on an intrinsically disordered protein: a high-pressure NMR study of α -synuclein". **ChemBiochem.** 14: 1754-1761
6. Dellarole M, Kobayashi K, Rouget J-B, Caro J.A, **Roche J**, Islam M.M, Garcia-Moreno B, Kuroda Y, Royer C.A. (2013) "Probing the physical determinants of thermal expansion of folded proteins". **J. Phys. Chem. B.** 117: 12742-12749
5. **Roche J**, Caro J.A, Dellarole M, Guca E, Royer C.A, Garcia-Moreno B, Garcia A.E, Roumestand C. (2013) "Structural, energetic and dynamic responses of the native state ensemble of staphylococcal nuclease to cavity-creating mutations". **Proteins** 81: 1069-1080
4. **Roche J**, Dellarole M, Caro J.A, Guca E, Norberto D.E, Yang T, Garcia A.E, Roumestand C, Garcia-Moreno B, Royer C.A. (2012) "Remodeling of the folding free-energy landscape of staphylococcal nuclease by cavity-creating mutations". **Biochemistry** 51: 9535-9546
3. **Roche J**, Caro J.A, Norberto D.E, Barthe P, Roumestand C, Schlessman J.L, Garcia A.E, Garcia-Moreno B, Royer C.A. (2012) "Cavities determine the pressure unfolding of proteins". **Proc. Natl. Acad. Sci. USA.** 109: 6945-6950
2. Rouget J-B, Aksel T, **Roche J**, Saldana J.L, Garcia A.E, Barrick D, Royer C.A. (2011) "Size and sequence and the volume change of protein folding". **J. Am. Chem. Soc.** 133: 6020-6027
1. Kitahara R, Hata K, Maeno A, Akasaka K, Chimenti M.S, Garcia-Moreno B, Schroer M.A, Jeworrek C, Tolan M, Winter R, **Roche J**, Roumestand C, Montet de Guillen K, Royer C.A. (2011) "Structural plasticity of staphylococcal nuclease probed by perturbation with pressure and pH". **Proteins** 79: 1293-1305

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- **Roche J**, Louis J.M, Bax A. (2014) **ChemBiochem.** 16: 214-218

- Nguyen L.M, **Roche J**. (2017) **J. Magn. Reson.** 277: 179-185



Book chapter:

1. Roche J, Dellarole M, Royer C.A, Roumestand C. (2015) “Exploring the protein folding pathway with high-pressure NMR: steady-state and kinetics studies.” **High pressure Bioscience: basic concepts, applications and frontiers (Subcell Biochem.)** 72: 261-278

Peer reviewer for scientific journals:

- Journal of American Chemical Society
- Biophysical Journal
- Scientific Reports
- Journal of Biomolecular NMR
- Proteins: Structure, Function and Bioinformatics
- Journal of Photochemistry and Photobiology
- Biochemistry
- Chemical Physics Letters
- Biochemistry and Biophysics Reports

Conferences:

- 61st Biophysical Society Meeting, 2017 (New Orleans, LA, USA): **Talk**
- 252nd ACS National Meeting, 2016 (Philadelphia, PA, USA): **Invited Talk**
- 60th Biophysical Society Meeting, 2016 (Los Angeles, CA, USA): **Talk**
- DCO workshop on extreme biophysics, 2015 (Washington, DC, USA): **Invited talk**
- 56th ENC, 2015 (Pacific Grove, USA): **Poster**
- 59th Biophysical society meeting, 2015 (Baltimore, MD, USA): **Talk**
- 7th IMBP, 2014 (Montpellier, France): **Invited talk**.
- Biomolecular structure, dynamics and function: membrane proteins, 2014 (Nashville, TN, USA): **Talk**
- 58th Biophysical society meeting, 2014 (San Francisco, CA, USA): **Poster**
- 51st EHPRG, 2013 (London, UK): **Invited talk**.
- 56th Biophysical Society meeting, 2012 (San Diego, CA, USA): **Talk**.
- 6th IMBP, 2011 (Otsu, Japan): **Talk**.
- 49th EHPRG, 2011 (Budapest, Hungary): **Poster**
- 8th EBSA, 2011 (Budapest, Hungary): **Talk**.
- GERM conference, 2011 (Sitges, Spain): **Talk**.