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Career and Education

- Jul 2017 – present **Associate Research Professor**, Physics Dept., Carnegie Mellon, Pittsburgh, PA, and **Staff Scientist**, Center for Neutron Research, National Institute for Standards and Technology, Gaithersburg, MD
- Jun 2011 – Jul 2017 **Assistant Research Professor**, Physics Dept., Carnegie Mellon, Pittsburgh, PA, and **Staff Scientist**, Center for Neutron Research, National Institute for Standards and Technology, Gaithersburg, MD
- Jun 2008 – May 2011 **Research Physicist**, Physics Dept., Carnegie Mellon, Pittsburgh, PA, and **Staff Scientist**, Center for Neutron Research, National Institute for Standards and Technology, Gaithersburg, MD
- Sep 2005 – May 2008 **Post-Doctoral Research Fellow**, Physics Dept., Carnegie Mellon, Pittsburgh, PA, and Center for Neutron Research, National Institute for Standards and Technology, Gaithersburg, MD
- Jun 2005 – Aug 2005 **Post-Doctoral Research Fellow**, Dept. of Biophysics, Johns Hopkins University, Baltimore MD, and Center for Neutron Research, National Institute for Standards and Technology, Gaithersburg MD
- May 2005 **Ph.D. in Nuclear Physics**, University of Leipzig, Germany
Thesis: „Electric field gradients in biomolecules – experiment and calculation“
- Sep 2001 **M.A. in Physics**, University of Leipzig,
Diploma-thesis: „Corrosion of Hillumin® battery electrodes studied with time-differential perturbed angular correlation (TDPAC) spectroscopy“

Publications in refereed journals

1. Michalak D. J., Unger B., Lorimer E., Grishaev A., Williams C. L., Heinrich F., Lösche M., *Structural and biophysical properties of farnesylated KRas interacting with the chaperone SmgGDS-558*. Biophysical Journal (2022), DOI: 10.1016/j.bpj.2022.05.028, available online
2. Heinrich F., Van Q. N., Jean-Francois F., Stephen A. G., Lösche M., *Membrane-Bound KRAS Approximates an Entropic Ensemble of Configurations*. Biophysical Journal 120:4055 (2021), DOI: 10.1016/j.bpj.2021.08.008
3. Comert F., Heinrich F., Chowdhury A., Schoeneck M., Darling C., Anderson K. W., Daben M., Libardo M. D. J., Angeles-Boza A. M., Silin V., Cotten M. L., Mihailescu M., *Copper-binding anticancer peptides from the piscidin family: an expanded mechanism that encompasses physical and chemical bilayer disruption*. Scientific Reports 11:12620 (2021), DOI: 10.1038/s41598-021-91670-w
4. Soubias O., Pant S., Heinrich F., Zhang Y., Roy N. S., Li J., Jian X., Yohe M. E., Randazzo P. A., Lösche M., Tajkhorshid E., Byrd R. A., *Membrane surface recognition by the ASAP1 PH domain and consequences for interactions with the small GTPase Arf1*. Science Advances 6:eabd1882 (2020), DOI: 10.1126/sciadv.abd1882
5. Naidjonoka P., Palsson G. K., Heinrich F., Stalbrand H., Nylander T., *On the interaction of softwood hemicellulose with cellulose surfaces in relation to molecular structure and physicochemical properties of hemicellulose*. Soft Matter 16:7063 (2020), DOI: 10.1039/D0SM00264J
6. Van Q. N., Lopez C. A., Tonelli M., Taylor T., Niu B., Stanley C., Bhowmik D., Tran T. H., Frank P. H., Messing S., Alexander P., Scott D., Ye X., Drew M., Chertov O., Lösche M., Ramanathan A., Gross M. L., Hengartner N., Westler W. M., Markley J. L., Simanshu D. K., Nissley D. V., McCormick F., Gillette W. K., Esposito D., Gnanakaran S., Heinrich F., Stephen A. G., *Uncovering a membrane-distal conformation of KRAS available to recruit RAF to the plasma membrane*. PNAS 117:24258 (2020) DOI: 10.1073/pnas.2006504117
7. Heinrich F., Kienzle P. A., Hoogerheide D. P., Lösche M., *Information Gain from Isotopic Contrast Variation in Neutron Reflectometry on Protein-Membrane Complex Structures.*, Journal of Applied Crystallography 53:800 (2020), DOI: 10.1107/S1600576720005634
8. Heinrich F., Salyapongse A., Kumagi A., Dupuy F. G., Shukla K., Penk A., Huster D., Ernst R. K., Pavlova A., Gumbart J. C., Deslouches B., Di Y. P., Tristram-Nagle S., *Synergistic Biophysical Techniques Reveal Structural Mechanisms of Engineered Cationic Antimicrobial Peptides in Lipid Model Membranes*. Chemistry—A European Journal 26:6247 (2020), DOI: 10.1002/chem.202000212
9. Kumari H., Eisenhart A., Pajoubpong J., Heinrich F., Beck T. L., *Investigating partitioning of free versus macrocycle bound guest into a model POPC lipid bilayer*. RSC Advances 10:15148 (2020), DOI: 10.1039/D0RA02850A
10. Treece B. W., Heinrich F., Ramanathan A., Lösche M., *Steering Molecular Simulations with Neutron Reflection Data*. Journal of Chemical Theory and Computation 16(5):3408 (2020),

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11. Josey, B., Heinrich, F., Silin, V., Lösche, M., *Association of Model Neurotransmitters with Lipid Bilayer Membranes.*, Biophysical Journal 118(5):1044 (2020), DOI: 10.1016/j.bpj.2020.01.016
12. Pond, M. P., Eells, R., Treece, B. W., Heinrich, F., Lösche, M., Roux, B., *Membrane Anchoring of Hck Kinase via the Intrinsically Disordered SH4-U and Length Scale Associated with Subcellular Localization.* Journal of Molecular Biology 432:2985 (2020), DOI: <https://doi.org/10.1016/j.jmb.2019.11.024>
13. Kim, M., Heinrich, F., Haugstad, G., Yu, G., Yuan, G., Satija, S., Zhang, W., Seo, H., Metzger, J., Azarin, S., Lodge, T., Hackel, B., Bates, F., *"Spatial distribution of PEO-PPO-PEO block copolymer and PEO homopolymer in lipid bilayers"*, Langmuir 36(13):3393 (2020), DOI: <https://doi.org/10.1021/acs.langmuir.9b03208>
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15. Eells R., Hoogerheide D. P., Kienzle P. A., Lösche M., Majkrzak C. F., Heinrich F., 3. *Structural investigations of membrane-associated proteins by neutron reflectometry.* In: Nieh M.-P., Heberle F. A., Katsaras J. (Eds.), *Characterization of Biological Membranes: Structure and Dynamics* 87–130. De Gruyter, Berlin, Boston (2019) DOI: 10.1515/9783110544657-003
16. Clifton L. A., Hall S. C. L., Knowles T. J., Heinrich F. and Lakey, J. H., *Structural Investigations of Protein-Lipid Complexes Using Neutron Scattering.* In: Kleinschmidt J. (eds.) *Lipid-Protein Interactions.* Methods in Molecular Biology 2003:201, Humana, New York, NY (2019) DOI: 10.1007/978-1-4939-9512-7_11
17. Treece, B. W., Kienzle, P. A., Hoogerheide, D. P., Majkrzak, C. F., Lösche, M., Heinrich, F., *Optimization of Reflectometry Experiments using Information Theory.* Journal of Applied Crystallography 52:47 (2019) DOI: 10.1107/S1600576718017016
18. Ashkar, R., Bilheux, H., Bordallo H., Briber, R., Callaway D., Cheng, X., Chu, X.-Q., Curtis, J., Dadmun, M., Fenimore, P., Fushman, D., Gabel, F., Gupta, K., Heberle, F., Heinrich, F., Hong, L., Katsaras J., Kelman, Z., Kharlampievaj, E., Kneller, F., Kovalevsky, A., Krueger, S., Langan, P., Lieberman, R., Liu, Y., Loesche, M., Lyman, E., Mao, Y., Marino, J., Mattos, C., Meilleur, F., Moody, P., Nickels, J., O'Dell, W., O'Neill, H., Perez-Salas, U., Peters, J., Petridis, L., Sokolov, A., Stanley, C., Wagner, N., Weinrich, M., Weiss, K., Wymore, T. and Smith, J. *Progress and Prospects for Neutron Scattering in the Biological Sciences.* Acta Crystallographica Section D 74:1129 (2018) DOI: 10.1107/S2059798318017503
19. Dupuy, F.G., Pagano, I., Andenoro, K., Peralta, M.F., Elhady, Y., Heinrich, F., Tristram-Nagle, S., *Selective interaction of colistin with lipid model membranes.* Biophysical Journal 114:919 (2018) DOI: 10.1016/j.bpj.2017.12.027

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21. Vanegas J. M., Heinrich F., Rogers D. M., Carson B., La Bauve S., Vernon B. C., Rempe S. B., Akgun B., Satija S., Zheng A., Kielian M., Kent M. S., *Insertion of Dengue E into Lipid Bilayers by Neutron Reflectivity and Molecular Dynamics Simulations*. *BBA Biomembranes* 5:1216 (2018) DOI: 10.1016/j.bbamem.2018.02.012
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24. Jiang Z., Heinrich F., McGlinchey R. P., Gruschus J. M and Lee J. C., *Segmental Deuteration of α -Synuclein for Neutron Reflectometry on Tethered Bilayers*. *Journal of Chemical Physics Letters* 8:29 (2017), DOI 10.1021/acs.jpcllett.6b02304
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39. Rima Budvytyte, Gintaras Valincius, Gediminas Niaura, Vladislava Voiciuk, Mindaugas Mickevicius, Hilary Chapman, Haw-Zan Goh, Prabhanshu Shekhar, Frank Heinrich, Siddharth Shenoy, Mathias Lösche, and David J. Vanderah, *Structure and Properties of Tethered Bilayer Lipid Membranes with Unsaturated Anchor Molecules*. *Langmuir* 29:8645 (2013), DOI: 10.1021/la401132c
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44. Candace M. Pfefferkorn, Frank Heinrich, Alexander J. Sadt, Alexander S. Maltsev, Richard W. Pastor, Jennifer C. Lee *Depth of α -Synuclein in a Bilayer Determined by Fluorescence, Neutron Reflectometry, and Computation*. Biophysical Journal 102:613 (2012), DOI: 10.1016/j.bpj.2011.12.051
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