

## LIST OF MRSEC-SUPPORTED PUBLICATIONS

2021-2022 [241]

March 1, 2021 – February 28, 2022

IRG-1 [5]

### a. Primary MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [2]

1. A.L. Beyerlein, I.J. Beyerlein, Bessel function descriptions of magneto-chiral interactions (DMI)-magnetic and spin flexoelectric skyrmions, *Physica B: Condensed Matter* **613** (2021) 412980. DOI: 10.1016/j.physb.2021.412980
2. D.A. Kitchaev, A. **Van der Ven**, Tuning magnetic antiskyrmion stability in tetragonal inverse Heusler alloys, *Phys. Rev. Mater.* **5** (2021) 124408. DOI: 10.1103/PhysRevMaterials.5.124408

### b. Partial MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [3]

3. E. McCalla, E.E. Levin, J.E. Douglas, J.G. Barker, M. Frontzek, W. Tian, R.M. Fernandes, R. **Seshadri**, C. Leighton, Understanding magnetic phase coexistence in  $Ru_2Mn_{1-x}Fe_xSn$  Heusler alloys: A neutron scattering, thermodynamic, and phenomenological analysis, *Phys. Rev. Mater.* **5** (2021) 064417. DOI: 10.1103/PhysRevMaterials.5.064417
4. P.F. Rottmann, A.T. Polonsky, T. Francis, M.G. Emigh, M. Krispin, G. Rieger, M.P. Echlin, C.G. Levi, T.M. **Pollock**, TriBeam tomography and microstructure evolution in additively manufactured Alnico magnets, *Mater. Today* **49** (2021) 23–34. DOI: 10.1016/j.mattod.2021.05.00323
5. J.L. Zuo, D. Kitchaev, E.C. Schueller, J.D. Bocarsly, R. **Seshadri**, A. **Van der Ven**, S.D. **Wilson**, Magnetoentropic mapping and computational modeling of cycloids and skyrmions in the lacunar spinels  $GaV_4S_8$  and  $GaV_4Se_8$ , *Phys. Rev. Mater.* **5** (2021) 54410. DOI: 10.1103/PhysRevMaterials.5.054410

IRG-2 [10]

### a. Primary MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [7]

6. D.J. Grzetic, K.T. Delaney, G.H. **Fredrickson**, Electrostatic manipulation of phase behavior in immiscible charged polymer blends, *Macromolecules* **54** (2021) 2604–2616. DOI: 10.1021/acs.macromol.1c00095
7. S.K. Jain, D. Rawlings, S. Antoine, R.A. **Segalman**, S. Han, Confinement promotes hydrogen bond network formation and Grotthuss proton hopping in ion-conducting block copolymers, *Macromolecules* **55** (2022) 615–622. DOI: 10.1021/acs.macromol.1c01808

8. S.D. Jones, H. Nguyen, P.M. Richardson, Y.-Q. Chen, K.E. Wyckoff, C.J. **Hawker**, R.J. **Clément**, G.H. **Fredrickson**, R.A. **Segalman**, Design of polymeric zwitterionic solid electrolytes with superionic lithium transport, *ACS Cent. Sci.* **8** (2022) 169–175. DOI: 10.1021/acscentsci.1c01260
9. A. Nikolaev, P.M. Richardson, S. Xie, L.C. Llanes, S.D. Jones, O. Nordness, H. Wang, G.C. Bazan, R.A. **Segalman**, R.J. **Clément**, J. **Read de Alaniz**, Role of electron-deficient imidazoles in ion transport and conductivity in solid-state polymer electrolytes, *Macromolecules* **55** (2022) 971–977. DOI: 10.1021/acs.macromol.1c01979
10. N.S. Schauser, G.A. Kliegle, P. Cooke, R.A. **Segalman**, R. **Seshadri**, Database creation, visualization, and statistical learning for polymer Li<sup>+</sup>-electrolyte design, *Chem. Mater.* **33** (2021) 4863–4876. DOI: 10.1021/acs.chemmater.0c04767
11. N.S. Schauser, P.M. Richardson, A. Nikolaev, P. Cooke, G.A. Kliegle, E.M. Susca, K. Johnson, H. Wang, J. **Read de Alaniz**, R. **Clément**, R.A. **Segalman**, Optimum in ligand density for conductivity in polymer electrolytes, *Mol. Syst. Des. Eng.* **6** (2021) 1025–1038. DOI: 10.1039/D1ME00089F
12. A.M. Scheuermann, H. Wakidi, A.T. Lill, S. Oh, L.C. Llanes, C.A. D'Ambra, S. Antoine, M. Wang, M.L. **Chabinyk**, T.-Q. **Nguyen**, J. **Read de Alaniz**, C.M. **Bates**, Multiwavelength photodetectors based on an azobenzene polymeric ionic liquid, *ACS Appl. Polym. Mater.* **3** (2021) 5125–5133. DOI: 10.1021/acsapm.1c00884

**b. Partial MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [3]**

13. A. Abdilla, C.A. D'Ambra, Z. Geng, J.J. Shin, M. Czuczola, D.J. Goldfeld, S. Biswas, J.M. Mecca, S. Swier, T.D. Bekemeier, D.S. Laitar, M.W. Bates, C.M. **Bates**, C.J. **Hawker**, Silicone-based polymer blends: Enhancing properties through compatibilization, *J. Polym. Sci.* **59** (2021) 2114–2128. DOI: 10.1002/pol.20210453
14. H. Li, Y. Zhang, S. Jones, R. **Segalman**, G.G. Warr, R. Atkin, Interfacial nanostructure and friction of a polymeric ionic liquid-ionic liquid mixture as a function of potential at Au(1 1 1) electrode interface, *J. Colloid Interface Sci.* **606**, Part 2 (2022) 1170–1178. DOI: 10.1016/j.jcis.2021.08.067
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**a. Primary MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [8]**

16. M. Areyano, J.A. Booth, D. Brouwer, L.F. Gockowski, M.T. **Valentine**, R.M. **McMeeking**, Suction-controlled detachment of mushroom-shaped adhesive structures, *J. Appl. Mech.* **88** (2021) 031017. DOI: 10.1115/1.4049392

17. A.L. Chau, M.K. Cavanaugh, Y.-T. Chen, A.A. **Pitenis**, A simple contact mechanics model for highly strained aqueous surface gels, *Exp. Mech.* **61** (2021) 699–703.  
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18. A.L. Chau, J.M. Urueña, A.A. **Pitenis**, Load-independent hydrogel friction, *Biotribology* **26** (2021) 100183. DOI: 10.1016/j.biotri.2021.100183
19. G.D. Degen, K.C. Cunha, Z.A. Levine, J.H. **Waite**, J-E. **Shea**, Molecular context of dopa influences adhesion of mussel-inspired peptides, *J. Phys. Chem. B* **125** (2021) 9999–10008.  
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20. Z. Geng, J.J. Shin, Y. Xi, C.J. **Hawker**, Click chemistry strategies for the accelerated synthesis of functional macromolecules, *J. Polym Sci.* **59** (2021) 963–1042.  
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21. Y. Kwon, J.H. Bernstein, N. Cohen, M.T. **Valentine**, On-demand manufacturing capabilities of mussels enable robust adhesion to geometrically complex surfaces, *ACS Biomater. Sci. & Eng.* **7** (2021) 5099–5106. DOI: 10.1021/acsbiomaterials.1c00845
22. V.J. Shenoy, C.E.R. Edwards, M.E. **Helgeson**, M.T. **Valentine**, Design and characterization of a 3D-printed staggered herringbone mixer, *BioTechniques* **70** (2021) 285–289.  
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23. C. Zhang, D.L. Vigil, D. Sun, M.W. Bates, T. Loman, E.A. Murphy, S.M. Barbon, J.-A. Song, B. Yu, G.H. **Fredrickson**, A.K. Whittaker, C.J. **Hawker**, C.M. **Bates**, Emergence of hexagonally close-packed spheres in linear block copolymer melts, *J. Am. Chem. Soc.* **143** (2021) 14106–14114. DOI: 10.1021/jacs.1c03647

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24. M. Ciavarella, G. Cricri, R. **McMeeking**, A comparison of crack propagation theories in viscoelastic materials, *Theor. Appl. Fract. Mech.* **116** (2021) 103113.  
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26. N. Cohen, C.D. Eisenbach, Humidity-driven supercontraction and twist in spider silk, *Phys. Rev. Lett.* **128** (2022) 098101. DOI: 10.1103/PhysRevLett.128.098101
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30. M. Gu, Y. Luo, Y. He, M.E. **Helgeson**, M.T. **Valentine**, Uncertainty quantification and estimation in differential dynamic microscopy, *Phys. Rev. E* **104** (2021) 034610. DOI: 10.1103/PhysRevE.104.034610
31. M. Levin, M.T. **Valentine**, N. Cohen, Tuning the response of fluid filled hydrogel core-shell structures, *J. Mech. Behav. Biomed. Mater.* **120** (2021) 104605. DOI: 10.1016/j.jmbbm.2021.104605
32. E.O. McGhee, A.L. Chau, M.C. Cavanaugh, J.G. Rosa, C.L.G. Davidson IV, J. Kim, J.M. Uruña, B.S. Sumerlin, A.A. **Pitenis**, W.G. Sawyer, Amphiphilic gel lubrication and the solvophilic transition, *Biotribology* **26** (2021) 100170. DOI: 10.1016/j.biotri.2021.100170
33. S. Najafi, Y. Lin, A.P. Longhini, X. Zhang, K.T. Delaney, K.S. Kosik, G.H. **Fredrickson**, J-E. **Shea**, S. Han, Liquid-liquid phase separation of Tau by self and complex coacervation, *Protein Sci.* **30** (2021) 1393–1407. DOI: 10.1002/pro.4101
34. S.E. Seo, Y. Kwon, N.D. Dolinski, C.S. Sample, J.L. Self, C.M. **Bates**, M.T. **Valentine**, C.J. **Hawker**, Three-dimensional photochemical printing of thermally activated polymer foams, *ACS Appl. Polym. Mater.* **3** (2021) 4984–4991. DOI: 10.1021/acsapm.1c00726
35. J-E. **Shea**, R.B. Best, J. Mittal, Physics-based computational and theoretical approaches to intrinsically disordered proteins, *Curr. Opin. Struct. Biol.* **67** (2021) 219–225. DOI: 10.1016/j.sbi.2020.12.012
36. M.M. Sroda, J. Lee, Y. Kwon, F. Stricker, M. Park, M.T. **Valentine**, J. **Read de Alaniz**, Role of material composition in photothermal actuation of DASA-based polymers, *ACS Appl. Polym. Mater.* **4** (2022) 141–149. DOI: 10.1021/acsapm.1c01108
37. B.G.P. van Ravensteijn, R.B. Zerdan, C.J. **Hawker**, M.E. **Helgeson**, Role of architecture on thermorheological properties of poly(alkyl methacrylate)-based polymers, *Macromolecules* **54** (2021) 5473–5483. DOI: 10.1021/acs.macromol.1c00149
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## SEED [9]

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39. B.B. Haidet, L. Nordin, A.J. Muhowski, K.D. Vallejo, E.T. Hughes, J. Meyer, P.J. Simmonds, D. Wasserman, K. Mukherjee, Interface structure and luminescence properties of epitaxial PbSe films on InAs(111)A, *J. Vac. Sci. Tech. A* **39** (2021) 023404. DOI: 10.1116/6.0000774
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41. M.E. Turiansky, C.G. Van de Walle, Impact of dangling bonds on properties of h-BN, *2D Mater.* **8** (2021) 024002. DOI: 10.1088/2053-1583/abe4bb  
(Published 25 February 2021. This paper was missed when compiling last year's report.)

**b. Partial MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [6]**

42. J. Meyer, A.J. Muhowski, L. Nordin, E. Hughes, B. Haidet, D. Wasserman, K. Mukherjee, Bright mid-infrared photoluminescence from high dislocation density epitaxial PbSe films on GaAs, *APL Mater.* **9** (2021) 111112. DOI: 10.1063/5.0070555
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44. L. Razinkovas, M.W. Doherty, N.B. Manson, C.G. Van de Walle, A. Alkauskas, Vibrational and vibronic structure of isolated point defects: The nitrogen-vacancy center in diamond, *Phys. Rev. B* **104** (2021) 045303. DOI: 10.1103/PhysRevB.104.045303
45. M. Romanova, V. Vlček, Stochastic many-body calculations of moiré states in twisted bilayer graphene at high pressures, *npj Comput. Mater.* **8** (2022) Article number: 11. DOI: 10.1038/s41524-022-00697-8
46. J-X. Shen, M.E. Turiansky, D. Wickramaratne, C.G. Van de Walle, Thermodynamics of boron incorporation in B<sub>2</sub>GaN, *Phys. Rev. Mater.* **5** (2021) L030401. DOI: 10.1103/PhysRevMaterials.5.L030401
47. H. Zhao, H. Li, L. Dong, B. Xu, J. Schneeloch, R. Zhong, M. Fang, G. Gu, J. Harter, S.D. Wilson, Z. Wang, I. Zeljkovic, Nematic transition and nanoscale suppression of superconductivity in Fe(Te,Se), *Nat. Phys.* **17** (2021) 903–908. DOI: 10.1038/s41567-021-01254-8

**iSUPERSEED [3]**

**a. Primary MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [0]**

None

**b. Partial MRSEC Support that Acknowledge the MRSEC Award DMR-1720256 [3]**

48. M.J. Bowick, N. Fakhri, M.C. Marchetti, S. Ramaswamy, Symmetry, thermodynamics, and topology in active matter, *Phys. Rev. X* **12** (2022) 010201. DOI: 10.1103/PhysRevX.12.010501
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## SHARED FACILITIES [191]

51. M. Abdelghany, A.A. Farid, M.E. Rasekh, U. Madhow, M.J.W. Rodwell, A design framework for all-digital mmWave massive MIMO with per-antenna nonlinearities, *IEEE Trans. Wireless Commun.* **20** (2021) 5689–5701. DOI: 10.1109/TWC.2021.3069378
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55. S. Antoine, Z. Geng, E.S. Zofchak, M. Chwatko, G.H. **Fredrickson**, V. Ganesan, C.J. **Hawker**, N.A. Lynd, R.A. **Segalman**, Non-intuitive trends in Flory–Huggins interaction parameters in polyether-based polymers, *Macromolecules* **54** (2021) 6670–6677. DOI: 10.1021/acs.macromol.1c00134
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