

## THOMAS J. KEMPA

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### PROFESSIONAL APPOINTMENTS

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#### Johns Hopkins University

Assistant Professor, Department of Chemistry	2015 – present
Assistant Professor, Department of Materials Science and Engineering	2017 – present

#### Massachusetts Institute of Technology & Harvard University

Postdoctoral Fellow, Department of Chemistry	2012 – 2015
<i>Advisor: Prof. Daniel G. Nocera</i>	

### EDUCATION

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#### Harvard University

Ph. D. in Chemistry	2006 – 2012
<i>Advisor: Prof. Charles M. Lieber</i>	

#### Imperial College London

Post-graduate studies during Marshall Scholarship	2004 – 2006
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#### Boston College

B.S. in Chemistry with Highest Honors, <i>magna cum laude</i>	2000 – 2004
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### AWARDS & HONORS

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Catalyst Award, Johns Hopkins University	2022
DARPA Young Faculty Award	2021
35 PIs under 35 Recognition for Materials Science Contributions, <i>Matter</i>	2021
Career Impact Award for Excellence in Mentorship, Johns Hopkins University	2021
Discovery Award, Johns Hopkins University	2020
Discovery Award, Johns Hopkins University	2019
Emerging Investigator Award, <i>J. Mater. Chem. A</i>	2019
NSF CAREER Award	2018
Toshiba Distinguished Young Investigator	2018
Beckman Young Investigator, Finalist	2017
Dreyfus Foundation Fellowship in Environmental Chemistry	2015
IUPAC Young Chemist Prize for Best Ph.D. Research	2013
Dudley R. Herschbach Teaching Award, Harvard University	2011
Fieser Award Lecture, Harvard University	2011
Materials Research Society Graduate Student Award	2011
NSF Graduate Research Fellow	2006 – 2009
Marshall Scholar (Class of 2004)	2004 – 2006
Matthew Copithorne Fellowship, Boston College	2004
Phi Beta Kappa	2003
Arnold and Mabel Beckman Scholar	2002 – 2003

## PUBLICATIONS

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*Summary of Publication Record:* 36 journal publications, 3 manuscripts submitted, 2 manuscripts in preparation, 4 patents issued, 1 patent pending  
 \* corresponding author, † equal contribution, ^ undergraduate co-author

### **Independent Career**

41. D. Weiss, K. Kingsbury, Y. Zhu, and **T. J. Kempa**\*  
 “Reliable fabrication of field-effect devices from 2D molecular framework crystals”  
*In preparation.* (2022)
40. B. O. Stephens, M. Sliwa, Z. Zhang, and **T. J. Kempa**\*  
 “Tracking ligand displacement from the surface of AgBr nanoparticles”  
*In preparation.* (2022)
39. R. Dziobek-Garrett<sup>†</sup>, C. J. Imperiale<sup>†</sup>, M. W. B. Wilson\*, **T. J. Kempa**\*  
 “Photon upconversion in a 2D inorganic-organic semiconductor superlattice”  
*Submitted.* (2022)
38. G. Wang, F. J. Claire, S. Xun, E. Ma, M. Solomos, H. Li, J. L. Brédas, **T. J. Kempa**\*, M. F. Crommie\*  
 “Structure and electronic properties of a single crystal 2D metal-organic framework”  
*Submitted.* (2022)
37. R. Dziobek-Garrett, S. Sriramini, O. Ambrozaite, S. Hilliard, T. Chowdhury, and **T. J. Kempa**\*  
 “Controlling morphology and excitonic disorder in monolayer WSe<sub>2</sub>”  
*Submitted.* (2022)
36. Y. Lei<sup>†</sup>, T. Zhang<sup>†</sup>, Y.-C. Lin<sup>†</sup>, T. Granzier-Nakajima<sup>†</sup>, G. Bepete<sup>†</sup>, D. A. Kowalczyk<sup>†</sup>, Z. Lin<sup>†</sup>, D. Zhou<sup>†</sup>, T. F. Schranghamer<sup>†</sup>, A. Dodda<sup>†</sup>, A. Sebastian<sup>†</sup>, Y. Chen<sup>†</sup>, Y. Liu<sup>†</sup>, G. Pourtois<sup>†</sup>, **T. J. Kempa**<sup>†</sup>, B. Schuler<sup>†</sup>, M. Edmonds<sup>†</sup>, S. Y. Quek<sup>†</sup>, U. Wurstbauer<sup>†</sup>, S. Wu<sup>†</sup>, N. Glavin<sup>†</sup>, S. Das<sup>†</sup>, S. Dash<sup>†</sup>, J. Redwing<sup>†</sup>, J. A. Robinson<sup>†</sup>, M. Terrones<sup>†</sup>  
 “Graphene and Beyond: Recent Advances in Two-Dimensional Materials Synthesis, Properties, and Devices”  
*ACS Nanoscience Au* DOI: 10.1021/acsnanoscienceau.2c00017 (2022). [Link](#)  
 Impact Factor: –
35. E. C. Sadler, T. Chowdhury, R. Dziobek-Garrett, O. Ambrozaite, C. Li, T. Mueller, and **T. J. Kempa**\*  
 “Role of H<sub>2</sub> in the substrate-directed synthesis of size-tunable MoSe<sub>2</sub> nanoribbons for exciton engineering”  
*ACS Appl. Nano Mater.* **5**, 11423–11428 (2022). [Link](#)  
 Impact Factor (2021): 6.1
34. B. Aguado<sup>†</sup>, L. Bray<sup>†</sup>, S. Caneva<sup>†</sup>, J.-P. Correa-Baena<sup>†</sup>, G. Di Martino<sup>†</sup>, C. Fang<sup>†</sup>, Y. Fang<sup>†</sup>, P. Gehring<sup>†</sup>, G. Grosso<sup>†</sup>, X. Gu<sup>†</sup>, P. Guo<sup>†</sup>, Y. He<sup>†</sup>, **T. J. Kempa**<sup>†</sup>, M. Kutys<sup>†</sup>, J. Li<sup>†</sup>, T. Li<sup>†</sup>, B. Liao<sup>†</sup>, F. Liu<sup>†</sup>, F. Molina-Lopez<sup>†</sup>, A. Pickel<sup>†</sup>, A. M. Porras<sup>†</sup>, R. Raman<sup>†</sup>, E. M. Sletten<sup>†</sup>, Q. Smith<sup>†</sup>, C. Tan<sup>†</sup>, H. Wang<sup>†</sup>, H. Wang<sup>†</sup>, S. Wang<sup>†</sup>, Z. Wang<sup>†</sup>, G. Wehmeyer<sup>†</sup>, L. Wei<sup>†</sup>, Y. Yang<sup>†</sup>, L. D. Zarzar<sup>†</sup>, M. Zhao<sup>†</sup>, Y. Zheng<sup>†</sup>, S. Cranford<sup>†</sup>  
 “35 challenges in materials science being tackled by PIs under 35(ish) in 2021”  
*Matter* **4**, 3804–3810 (2021). [Link](#)

Impact Factor (2021): 20.0

33. T. Chowdhury, K. Jo, S. B. Anantharaman, T. H. Brintlinger, D. Jariwala, and **T. J. Kempa\***  
“Anomalous room-temperature photoluminescence from nano-strained MoSe<sub>2</sub> monolayers”  
*ACS Photonics* **8**, 2220–2226 (2021). [Link](#)  
Impact Factor (2020): 7.5
32. T. H. Brintlinger, T. Chowdhury, and **T. J. Kempa**  
“Identification of nanoscale localized strain in 2D transition metal dichalcogenide hybrid architectures through scanning transmission electron microscopy”  
*Microsc. Microanal.* **27**, 662–664 (2021). [Link](#)  
Impact Factor (2019): 3.4
31. E. S. Thompson, H. Gangi, J. Hwang, and **T. J. Kempa\***  
“Parallel synthesis of nanoscale Si superlattices through eutectic confinement for semiconductor p–n junctions”  
*ACS Appl. Nano Mater.* **4**, 985–989 (2021). [Link](#)  
Impact Factor (2021): 6.1
30. F. J. Claire<sup>†</sup>, M. A. Solomos<sup>†</sup>, J. Kim, G. Wang, M. A. Siegler, M. F. Crommie, and **T. J. Kempa\***  
“Structural and electronic switching of a single crystal 2D metal-organic framework prepared by chemical vapor deposition”  
*Nature Commun.* **11**, 5524 (2020). [Link](#) [Featured as *Editors’ Highlight Article*]  
Impact Factor (2021): 17.7
29. T. Chowdhury<sup>†</sup>, E. C. Sadler<sup>†</sup>, and **T. J. Kempa\***  
“Progress and prospects in transition-metal dichalcogenide research beyond 2D”  
*Chem. Rev.* **120**, 12563–12591 (2020). [Link](#)  
Impact Factor (2020): 60.6
28. M. Sliwa<sup>†</sup>, B. O. Stephens<sup>†</sup>, Z. Zhang, and **T. J. Kempa\***  
“Harnessing host-guest interactions to control structure at the nanoscale”  
*Pure Appl. Chem.* **92**, 1895–1900 (2020). [Link](#)  
Impact Factor (2017): 5.3
27. E. C. Sadler, and **T. J. Kempa\***  
“Chalcogen incorporation process during high vacuum conversion of bulk Mo oxides to Mo dichalcogenides”  
*ACS Appl. Electron. Mater.* **2**, 1020–1025 (2020). [Link](#)  
Impact Factor (2021): 4.5
26. T. Chowdhury, J. Kim, E. C. Sadler, C. Li, S.-W. Lee, K. Jo, W. Xu, D. H. Gracias, N. V. Drichko, D. Jariwala, T. H. Brintlinger, T. Mueller, H.-G. Park, and **T. J. Kempa\***  
“Substrate-directed synthesis of MoS<sub>2</sub> nanocrystals with tunable dimensionality and optical properties”  
*Nature Nanotechnol.* **15**, 29–34 (2020). [Link](#)  
Impact Factor (2020): 39.2
25. M. A. Solomos, F. J. Claire, and **T. J. Kempa\***  
“2D molecular crystal lattices: Advances in their synthesis, characterization, and application”  
*J. Mater. Chem. A* **7**, 23537–23562 (2019). [Link](#) [Emerging Investigator Invited Issue]

Impact Factor (2020): 12.7

24. Y. Wang, D. Sun, T. Chowdhury, J. S. Wagner, **T. J. Kempa**, and A. S. Hall\*  
"Rapid room-temperature synthesis of a metastable ordered intermetallic electrocatalyst"  
*J. Am. Chem. Soc.* **141**, 2342–2347 (2019). [Link](#)  
Impact Factor (2021): 16.4
23. M. M. Li<sup>†</sup>, F. J. Claire<sup>†</sup>, M. A. Solomos<sup>†</sup>, S. M. Tenney<sup>^</sup>, S. Ivanov, M. A. Siegler, and **T. J. Kempa**\*  
"Molecular chains of coordinated dimolybdenum isonicotinate paddlewheel clusters"  
*RSC Adv.* **9**, 16492–16495 (2019). [Link](#)  
Impact Factor (2021): 4.0
22. F. J. Claire<sup>†</sup>, S. M. Tenney<sup>†,^</sup>, M. M. Li<sup>†</sup>, M. A. Siegler, J. S. Wagner, A. S. Hall, and **T. J. Kempa**\*  
"Hierarchically ordered two-dimensional coordination polymers assembled from redox-active dimolybdenum clusters"  
*J. Am. Chem. Soc.* **140**, 10673–10676 (2018). [Link](#)  
Impact Factor (2021): 16.4
21. A. E. Kossak<sup>†,^</sup>, B. O. Stephens<sup>†</sup>, Y. Tian, P. Liu, M. Chen, and **T. J. Kempa**\*  
"Anisotropic and multicomponent nanostructures by controlled symmetry breaking of metal halide intermediates"  
*Nano Lett.* **18**, 2324–2328 (2018). [Link](#)  
Impact Factor (2021): 12.3
20. N. Li<sup>†</sup>, D. K. Bediako<sup>†</sup>, R.-G. Hadt, D. Hayes, **T. J. Kempa**, F. Cube, D. C. Bell, L. X. Chen, and D. G. Nocera\*  
"Influence of iron doping on tetravalent nickel content in catalytic oxygen evolving films"  
*Proc. Natl. Acad. Sci. USA* **114**, 1486–1491 (2017). [Link](#)  
Impact Factor (2021): 12.8
19. H. G. Park, S. K. Kim, K. D. Song, **T. J. Kempa**, and C. M. Lieber  
"Multishell nanowires for next-generation photovoltaics"  
*Prog. Electromagn. Res.* **1**, 1864 (2016). [Link](#)  
Impact Factor (2020): 3.0

#### ***Prior to Joining JHU Faculty***

18. **T. J. Kempa**, D. K. Bediako, S.-K. Kim, H.-G. Park, and D. G. Nocera  
"High-throughput patterning of photonic structures with tunable periodicity"  
*Proc. Natl. Acad. Sci. USA* **112**, 5309–5313 (2015). [Link](#)  
Impact Factor (2021): 12.8
17. **T. J. Kempa**, D. K. Bediako, E. C. Jones, C. M. Lieber, and D. G. Nocera  
"Facile, rapid, and large-area periodic patterning of semiconductor substrates with sub-micron inorganic structures"  
*J. Am. Chem. Soc.* **137**, 3739–3742 (2015). [Link](#)  
Impact Factor (2021): 16.4
16. C. M. Lemon, E. Karnas, X. Han, O. T. Bruns, **T. J. Kempa**, D. Fukumura, M. G. Bawendi, R. K. Jain, D. G. Duda, and D. G. Nocera  
"Micelle-Encapsulated Quantum Dot-Porphyrin Assemblies as *in vivo* Two-Photon Oxygen

- Sensors"  
*J. Am. Chem. Soc.* **137**, 9832–9842 (2015). [Link](#)  
Impact Factor (2021): 16.4
15. K.-D. Song, **T. J. Kempa**, H.-G. Park, and S.-K. Kim  
"Laterally assembled nanowires for ultrathin broadband solar absorbers"  
*Opt. Express* **22**, A992–A1000 (2014). [Link](#)  
Impact Factor (2021): 3.8
  14. S.-K. Kim, K.-D. Song, **T. J. Kempa**, R. W. Day, C. M. Lieber, and H.-G. Park  
"Design of nanowire optical cavities as efficient photon absorbers"  
*ACS Nano* **8**, 3707–3714 (2014). [Link](#)  
Impact Factor (2021): 18.0
  13. **T. J. Kempa** and C. M. Lieber  
"Semiconductor nanowire solar cells: Synthetic advances and tunable properties"  
*Pure Appl. Chem.* **86**, 13–26 (2014). [Link](#) [IUPAC Young Chemist Prize Invited Review]  
Impact Factor (2017): 5.3
  12. **T. J. Kempa**, S.-K. Kim, H.-G. Park, R. W. Day, D. G. Nocera, and C. M. Lieber  
"Facet-selective growth on nanowires yields multi-component nanostructures and photonic devices"  
*J. Am. Chem. Soc.* **135**, 18354–18357 (2013). [Link](#)  
Impact Factor (2021): 16.4
  11. **T. J. Kempa**, R. W. Day, S.-K. Kim, H.-G. Park, and C. M. Lieber  
"Semiconductor nanowires: A platform for exploring limits and concepts for nano-enabled solar cells"  
*Energy Environ. Sci.* **6**, 719–733 (2013). [Link](#) [Feature Review Article]  
Impact Factor (2020): 38.5
  10. S.-K. Kim, R. W. Day, J. F. Cahoon, **T. J. Kempa**, K.-D. Song, H.-G. Park, and C. M. Lieber  
"Tuning light absorption in core/shell silicon nanowire photovoltaic devices through morphological design"  
*Nano Lett.* **12**, 4971–4976 (2012). [Link](#)  
Impact Factor (2021): 12.3
  9. **T. J. Kempa**, J. F. Cahoon, S.-K. Kim, R. W. Day, D. C. Bell, H.-G. Park, and C. M. Lieber  
"Coaxial multishell nanowires with high-quality electronic interfaces and tunable optical cavities for ultrathin photovoltaics"  
*Proc. Natl. Acad. Sci. USA* **109**, 1407–1412 (2012). [Link](#)  
Impact Factor (2021): 12.8
  8. B. Tian, P. Xie, **T. J. Kempa**, D.C. Bell, and C. M. Lieber  
"Single crystalline kinked semiconductor nanowire superstructures"  
*Nature Nanotechnol.* **4**, 824–829 (2009). [Link](#)  
Impact Factor (2020): 39.2
  7. Y. Dong, B. Tian, **T. J. Kempa**, and C. M. Lieber  
"Coaxial group III-nitride nanowire photovoltaics"  
*Nano Lett.* **9**, 2183–2187 (2009). [Link](#)

Impact Factor (2021): 12.3

6. B. Tian, **T. J. Kempa**, and C. M. Lieber  
"Single nanowire photovoltaics"  
*Chem. Soc. Rev.* **38**, 16–24 (2009). [Link](#)  
Impact Factor (2020): 54.6
5. **T. J. Kempa**, B. Tian, D. Kim, J. Hu, X. Zheng, and C. M. Lieber  
"Single and tandem axial p-i-n nanowire photovoltaic devices"  
*Nano Lett.* **8**, 3456–3460 (2008). [Link](#)  
Impact Factor (2021): 12.3
4. B. Tian, X. Zheng, **T. J. Kempa**, Y. Fang, N. Yu, G. Yu, J. Huang, and C. M. Lieber  
"Coaxial silicon nanowires as solar cells and nanoelectronic power sources"  
*Nature* **449**, 885–890 (2007). [Link](#)  
Impact Factor (2021): 69.5
3. **T. Kempa**, R. Farrer, M. Giersig, and J. T. Fourkas  
"Photochemical synthesis and multiphoton luminescence of monodisperse silver nanocrystals"  
*Plasmonics* **1**, 45–51 (2006). [Link](#)  
Impact Factor (2020): 2.4
2. **T. Kempa**, D. Carnahan, M. Olek, M. Correa, M. Giersig, M. Cross, G. Benham, M. Sennett, Z. F. Ren, and K. Kempa  
"Dielectric media based on isolated metallic nanostructures"  
*J. Appl. Phys.* **98**, 034310 (2005). [Link](#)  
Impact Factor (2021): 2.9
1. Y. Wang, K. Kempa, B. Kimball, J. B. Carlson, G. Benham, W. Z. Li, **T. Kempa**, J. Rybczynski, A. Herczynski, and Z. F. Ren  
"Receiving and transmitting light-like radio waves: Antenna effect in arrays of aligned carbon nanotubes"  
*Appl. Phys. Lett.* **85**, 2607–2609 (2004). [Link](#)  
Impact Factor (2021): 4.0

## BOOKS

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2. S-K. Kim, **T. J. Kempa**, C. M. Lieber, and H-G. Park.  
"Nanowire Photonics and their Applications" in *Computational Nanophotonics: Modeling and Applications*  
S. M. Musa, ed., CRC Press - Taylor and Francis Group, LLC, New York, 2013.
1. Edited and translated book chapter in *Nanoparticle Assemblies and Superstructures*  
N. Kotov, ed., Marcel Dekker Inc., New York, 2003.

## PATENTS

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5. **Thomas J. Kempa**, Tomojit Chowdhury, Jungkil Kim, Erick C. Sadler, WO 2021/097424 A1  
"Substrate directed synthesis of transition-metal dichalcogenide crystals with tunable dimensionality and optical properties" Filed May 20, 2021
4. **Thomas J. Kempa**, Eric Thompson, Hiro Gangi, Jongil Hwang, US 11,111,598  
"Crystal growth method in a semiconductor device" Issued Sept 7, 2021
3. Daniel G. Nocera, **Thomas J. Kempa**, Daniel K. Bediako, Charles M. Lieber, Evan C. Jones, "A method for nano- and micro-patterning using electrochemically active interfaces" WO 2016/130672 A1  
Issued Aug 18, 2016
2. Charles M. Lieber, Robert Day, Max Mankin, Ruixuan Gao, **Thomas J. Kempa**, "Controlled growth of nanoscale wires" WO 2015/171699  
Issued Nov 12, 2015
1. Charles M. Lieber, **Thomas J. Kempa**, Sun-Kyung Kim, Robert Day, Hong-Gyu Park, "Anisotropic Deposition in Nanoscale Wires" WO 2014/123860  
Issued Aug 14, 2014

## INVITED SEMINARS & CONFERENCE PRESENTATIONS

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*Summary of Invitations:* 23 invitations to academic departments, 22 invitations to conferences or professional meetings, 8 international invitations

### *Independent Career*

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|-----|--|-------------|
| 74. | Harvard University   Department of Chemistry<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>  | TBD         |
| 73. | Massachusetts Institute of Technology   Department of Chemistry<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | TBD         |
| 72. | Cambridge University   2D Transition Metal Dichalcogenides Conference<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | June, 2023  |
| 71. | University of Wisconsin, Madison   Department of Materials Science & Eng.<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | April, 2023 |
| 70. | ACS National Meeting   Symposium on Nanomaterials<br><i>Title: "Tailored Heterointerfaces in 2D Atomic Crystals &amp; 2D Molecular Frameworks"</i>   | March, 2023 |
| 69. | University of California San Diego   Department of Chemistry & Biochem<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>  | March, 2023 |
| 68. | Cornell University   Department of Materials Science & Engineering<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>  | Nov, 2022   |
| 67. | Columbia University   Department of Chemistry<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | Nov, 2022   |
| 66. | Morgan State University, DoD Center of Excellence   Workshop on Advanced Electro-Photonics with 2D Materials<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>                  | Sept, 2022  |
| 65. | Gordon Research Conference   Two Dimensional Electronics Beyond Graphene; Manchester, NH<br><i>Title: "Tailored Heterointerfaces in 2D Atomic Crystals and 2D Molecular Frameworks"</i>                  | June, 2022  |
| 64. | Columbia University   Center for Programmable Quantum Materials<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | May, 2022   |
| 63. | University of North Carolina, Chapel Hill   Department of Chemistry<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | April, 2022 |
| 62. | Northwestern University   Department of Chemistry & International Institute for Nanotechnology: "Frontiers in Nanotechnology"<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i> | April, 2022 |
| 61. | ACS National Meeting   Symposium on Interfacial Processes in Electrocatalysis<br><i>Title: "Catalyzing and Tailoring the Growth of 2D Materials at Chemically Structured Interfaces"</i>                 | March, 2022 |
| 60. | University of California Irvine   Department of Chemistry<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>   | Feb, 2022   |
| 59. | University of California Los Angeles   Department of Chemistry<br><i>Title: "Precision Synthesis of Quantum Material Building Blocks"</i>  | Feb, 2022   |
| 58. | California Institute of Technology   Department of Chemistry   | Feb, 2022   |



- Title: "Precision Synthesis of Quantum Material Building Blocks"*
57. University of Michigan | Department of Chemistry Dec, **2021**  
*Title: "Precision Synthesis of Quantum Material Building Blocks"*
  56. University of Chicago | Department of Chemistry Nov, **2021**  
*Title: "Precision Synthesis of Quantum Material Building Blocks"*
  55. ACS Middle Atlantic Regional Meeting | Porous Materials Session June, **2021**  
*Title: "Stimuli-responsive 2D MOFs prepared by CVD"*
  54. ACS Middle Atlantic Regional Meeting | Nanoparticles Session June, **2021**  
*Title: "Manipulation of dimensionality and strain in TMD nanocrystals"*
  53. Stanford University | Department of Chemistry May, **2021**  
*Title: "Building the Building Blocks of Quantum Materials"*
  52. 2021 Graphene and Beyond Workshop | Hosted by Penn State Center for 2D and Layered Materials; Virtual Meeting May, **2021**  
*Title: "Manipulation of dimensionality and strain in TMD nanocrystals"*
  51. MRS Spring Meeting | Symposium on Manipulation and Detection of Physical Properties of 2D Quantum Materials (NM06); Virtual Meeting Apr, **2021**  
*Title: "Manipulation of dimensionality and strain in TMD nanocrystals"*
  50. ACS National Meeting | Symposium on 2D Materials; Virtual Meeting Apr, **2021**  
*Title: "Precise manipulation of dimensionality and strain in 2D TMDs"*
  49. University of North Carolina, Greensboro | Department of Chemistry Mar, **2021**  
*Title: "Tailoring the flatlands to harness quantum phenomena"*
  48. University of Illinois, Urbana-Champaign | Department of Chemistry Mar, **2020**  
*Title: "Revealing the scaling properties of matter through designer low-dimensional crystals"*
  47. Carnegie-Mellon University | Department of Materials Science & Engineering Feb, **2020**  
*Title: "Revealing the scaling properties of matter through designer low-dimensional crystals"*
  46. George Mason University | Department of Chemistry Feb, **2020**  
*Title: "Chemically structured and tailored materials"*
  45. University of California Berkeley | Department of Chemistry Feb, **2020**  
*Title: "Tracing the evolution of atoms into solids through rationally designed low-dimensional materials"*
  44. International Conference on Advanced Materials & Devices; Jeju, S. Korea Dec, **2019**  
*Title: "2D Atomic and Molecular Crystals: Design, Synthesis, and New Properties"*
  43. MRS Fall Meeting | Symposium FF01; Boston, USA Dec, **2019**  
*Title: "Tuning the dimensionality and optical properties of TMDs with substrate directed synthesis"*
  42. ACS Southeast Regional Meeting | Well-Defined Supramolecular Materials; Savannah, USA Oct, **2019**  
*Title: "Gas-phase synthesis of responsive metal-organic framework thin films"*
  41. Georgetown University | Department of Chemistry Sept, **2019**  
*Title: "2D Atomic and Molecular Crystals: Design, Synthesis, and New Properties"*
  40. ACS National Meeting | Symposium on Nanoscale and Molecular Assemblies; San Diego, USA Aug, **2019**

- Title: "Gas-phase synthesis of hierarchically structured atomic and molecular lattices"*
39. Gordon Research Conference | Nanoporous Materials and their Applications; Andover, NH Aug, **2019**  
*Title: "Phase and electronic switching of single crystal MOFs prepared by chemical vapor deposition"*
  38. National University of Singapore | Department of Physics; Singapore July, **2019**  
*Title: "2D atomic and molecular lattices: New architectures yielding new properties"*
  37. Harvard University | Symposium in honor of Charles Lieber's 60<sup>th</sup> birthday Apr, **2019**  
*Title: "2D atomic and molecular lattices: Rational synthesis and new properties"*
  36. 6<sup>th</sup> International MOF Conference; Auckland, NZ Dec, **2018**  
*Title: "Increasing MOF functionality through responsive properties and new synthetic approaches"*
  35. MRS Fall Meeting | Symposium EP03; Boston, USA Nov, **2018**  
*Title: "Substrate directed synthesis of TMD crystals with tunable dimensionality and optical properties"*
  34. ACS National Meeting | Symposium INOR & COLL; Boston, USA Aug, **2018**  
*Title: "Hierarchically structured and responsive metal-organic frameworks"*
  33. NSF Center for Chemical Innovation | Solar Fuels Capstone Meeting; Ventura, USA July, **2018**  
*Title: "Control of hierarchy and energy transport in coordination polymers"*
  32. Toshiba Global R&D Center | Distinguished Young Investigator Talk; Tokyo, Japan June, **2018**  
*Title: "Control of hierarchy and energy transport in structured materials"*
  31. Gordon Research Conference | Two Dimensional Electronics Beyond Graphene; Andover, NH June, **2018**  
*Title: "Control of 2D TMD crystal morphology through prescribed substrate interactions"*
  30. International Conference on Advanced Materials & Devices; Jeju, S. Korea Dec, **2017**  
*Title: "Structured solid-state materials: Anisotropic and multi-component nanostructures"*
  29. OSA Asia Communications and Photonics Conference 2017 | Photonics for Energy; Guangzhou, China Nov, **2017**  
*Title: "Symmetry broken nanostructures: Anisotropic and multi-component nanoparticles"*
  28. The George Washington University | Department of Chemistry Oct, **2017**  
*Title: "Chemically Structured and Tailored Materials: Opportunities in Energy Science and Optoelectronics"*
  27. ACS National Meeting | Symposium INOR & COLL; Washington DC, USA Aug, **2017**  
*Title: "Metal organic frameworks as templates for materials synthesis"*
  26. MRS Spring Meeting | Symposium ED6; Phoenix, USA Apr, **2017**  
*Title: "Structured solid-state materials in energy conversion: Multi-component and anisotropic nanostructures"*
  25. Johns Hopkins University | OneChemistry Symposium; Baltimore, USA Mar, **2017**  
*Title: "Perspectives on recording and modulating chemical transients in the brain"*
  24. University of Ulm | Institute for Electron Devices; Ulm, Germany Jan, **2017**

*Title: "Structured solid-state materials"*

***Prior to Joining JHU Faculty***

- |     |  |                   |
|-----|--|-------------------|
| 23. | Massachusetts Institute of Technology   Department of Chemical Engineering                     | Feb, <b>2015</b>  |
| 22. | California Institute of Technology   Department of Chemistry                                   | Dec, <b>2014</b>  |
| 21. | Johns Hopkins University   Department of Chemistry   | Dec, <b>2014</b>  |
| 20. | University of California Los Angeles   Department of Chemistry                                 | Nov, <b>2014</b>  |
| 19. | Gordon Research Conference   Nanostructure Fabrication; Biddeford, ME                          | July, <b>2014</b> |
| 18. | University of Illinois Urbana-Champaign   Department of Materials Science and Engineering      | Feb, <b>2014</b>  |
| 17. | Massachusetts Institute of Technology   Boston Regional Inorganic Colloquium                   | Feb, <b>2014</b>  |
| 16. | NSF Center for Chemical Innovation   Solar Fuels Meeting; Huntington Beach, USA                | Jan, <b>2014</b>  |
| 15. | University of Washington Seattle   Department of Chemistry                                     | Jan, <b>2014</b>  |
| 14. | University of Maryland College Park   Department of Chemistry and Biochemistry                 | Jan, <b>2014</b>  |
| 13. | New York University   Department of Chemistry  | Dec, <b>2013</b>  |
| 12. | University of Pennsylvania   Department of Chemistry   | Dec, <b>2013</b>  |
| 11. | Gordon Research Seminar   Clusters, Nanocrystals, and Nanostructures; South Hadley, MA         | Aug, <b>2013</b>  |
| 10. | Photonics West Conference   LASE Symposium; San Francisco, USA                                 | Feb, <b>2013</b>  |
| 9.  | Korea Advanced Institute of Science and Technology   Physics Department; Daejeon, S. Korea     | June, <b>2012</b> |
| 8.  | Korea University   Physics Department; Seoul, S. Korea   | June, <b>2012</b> |
| 7.  | ACS National Meeting   Symposium on Sustainable Inorganic Chemistry; San Diego, USA            | Mar, <b>2012</b>  |
| 6.  | Harvard University   Fieser Award Lecture  | Sept, <b>2011</b> |
| 5.  | MRS Spring Meeting   Graduate Student Award Talk; San Francisco, USA                           | Apr, <b>2011</b>  |
| 4.  | Conference on 1D Nanostructures for Photovoltaics; Mallorca, Spain                             | Sept, <b>2010</b> |
| 3.  | Optical Society of America Conference at MIT; Cambridge, USA                                   | June, <b>2009</b> |
| 2.  | IEEE – Laser and Electro-Optics Society Meeting; Newport Beach, USA                            | Nov, <b>2008</b>  |
| 1.  | European Science Foundation Meeting on Nanotechnology for Renewable Energy; Obergurgl, Austria | June, <b>2008</b> |

**EXTERNAL SERVICE & PROFESSIONAL ACTIVITIES**

<b>Board Member</b>	<ul style="list-style-type: none"> <li>Member of Early Career Researcher Board of the journal <i>Multifunctional Materials</i></li> </ul>	2019 – 2022
<b>Organizer</b>	<ul style="list-style-type: none"> <li>Lead organizer of the 2021 Spring MRS Symposium on “2D Materials Beyond Graphene” (NM07)</li> <li>Co-organizer of the 2022 Conference on “Frontiers in Imaging and Quantum-Enabled Technologies for the Physical and Life Sciences.” Conference was held at Johns Hopkins University and sponsored by the <i>Hub for Imaging and Quantum Technologies</i> of which I am a co-director.</li> <li>Co-organizer of the 2023 Spring MRS Symposium on “Layered (2D) Optoelectronic Materials and Devices”</li> </ul>	Apr. 2021 Apr. 2022 Apr. 2023
<b>Workshop</b>	<ul style="list-style-type: none"> <li>Participant at the NSF Interdisciplinary Workshop on Hybrids &amp; Interfaces; SSMC-funded PI workshop</li> </ul>	Oct. 2019
<b>Examiner</b>	<ul style="list-style-type: none"> <li>External PhD examiner at Korea University (Jin-Sung Park)</li> <li>External PhD examiner at University of Ulm (Nico Hibst)</li> </ul>	Dec. 2019 Jan. 2017
<b>Reviewer</b>	<ul style="list-style-type: none"> <li>Reviewer for the following <u>journals</u>: <i>Journal of the American Chemical Society, Chemical Reviews, Nano Letters, ACS Nano, Physical Review X, Energy &amp; Environmental Science, Nature Communications, ACS Photonics, ACS Applied Materials and Interfaces, Advanced Functional Materials, Advanced Materials, Journal of Physical Chemistry Letters, Journal of Physical Chemistry C, Journal of Applied Physics, Nature Scientific Reports, Powder Diffraction, Science Advances, Chemistry of Materials, Chemical Science, npj 2D Materials and Applications, Pure and Applied Chemistry, ChemNanoMat, ACS Applied Energy Materials, Inorganic Chemistry, Applied Physics Letters, Annals of the New York Academy of Sciences</i></li> <li>Reviewer for the following <u>US funding agencies</u>: NSF (1 CAREER Panel in SSMC, 5 SSMC, 1 BMAT), AFOSR (2 MDTC), DoE (2 BES), NIST</li> <li>Reviewer for the following <u>International funding agencies</u>: Singapore MoE, Israel Science Foundation</li> </ul>	2015 – present 2016 – present 2021 – present
<b>Outreach</b>	<ul style="list-style-type: none"> <li>Faculty Facilitator on Visit to the <i>Office of Science and Technology Policy</i> to discuss Diversity Improvement in STEM fields</li> <li>Faculty Mentor, STEM Achievement in Baltimore Elementary Schools (SABES is an NSF funded collaboration between Baltimore City Public Schools and JHU)</li> <li>Faculty Spotlight Speaker at Hopkins Fall Open House</li> <li>Volunteer judge for Maryland Science Olympiad held at JHU</li> </ul>	Aug. 2016 2016 – 2018 Sept. 2018 Apr. 2016

## UNIVERSITY SERVICE

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<b>Director</b>	<ul style="list-style-type: none"> <li>• <i>Hub for Imaging and Quantum Technologies</i>   A major new research center funded by the Bloomberg Distinguished Professor program. I formulated one of the original concepts for the center, organized the team, and led the proposal which was awarded funding to build this center. <i>Directors:</i> Prof. Thomas Kempa, Prof. David Kaplan, Dr. Joan Hoffmann</li> </ul>	2021 – present
<b>Chair</b>	<ul style="list-style-type: none"> <li>• Chemistry Department Graduate Admissions Committee</li> </ul>	2017 – 2019
<b>Member</b>	<ul style="list-style-type: none"> <li>• Chemistry Department Graduate Admissions Committee</li> <li>• Chemistry Department BDP Search Committee</li> <li>• Materials Characterization &amp; Processing Facility Committee</li> <li>• Homewood Faculty Facilities Council (1 of 19 members)</li> <li>• Departmental GBO &amp; Thesis Committees (35 GBOs served)</li> </ul>	2015 – present 2020 – present 2017 – present 2018 – present 2015 – present
<b>Interviewer</b>	<ul style="list-style-type: none"> <li>• Interviewer for post-graduate Fellowships (<i>e.g.</i> Marshall, Rhodes, Gates). I help prepare JHU undergraduates for their Fellowship applications by conducting mock-interviews.</li> </ul>	2017 – present

## TEACHING

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<i>Parental Leave</i> (release from teaching)		Spring 2022
CHEMISTRY 306, Physical Chemistry Instrumentation Lab II	28 students	Fall 2021
<i>Junior Faculty Leave</i> (official pre-tenure teaching relief)		Spring 2021
CHEMISTRY 403, Optoelectronic Materials and Devices	10 students	Fall 2020
CHEMISTRY 306, Physical Chemistry Instrumentation Lab II	13 students	Spring 2020
CHEMISTRY 403, Optoelectronic Materials and Devices	12 students	Fall 2019
CHEMISTRY 306, Physical Chemistry Instrumentation Lab II	26 students	Spring 2019
CHEMISTRY 403, Optoelectronic Materials and Devices	18 students	Fall 2018
CHEMISTRY 306, Physical Chemistry Instrumentation Lab II	24 students	Spring 2018
CHEMISTRY 403, Optoelectronic Materials and Devices	22 students	Fall 2017
<i>Course Development</i> (developed new labs for CHEMISTRY 306)		Spring 2017
CHEMISTRY 403, Optoelectronic Materials and Devices	19 students	Fall 2016
<i>Teaching Relief</i> (official pre-tenure teaching relief)		Spring 2016
CHEMISTRY 403, Optoelectronic Materials and Devices	12 students	Fall 2015

## STUDENTS, POSTDOCS, & OTHER ADVISEES

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### Current Graduate Students and Postdocs (8):

Marta Sliwa   <i>Research: multicomponent nanoparticles, plasmonics</i>	Kempa Lab, 6 <sup>th</sup> year Ph.D. student	2017 – present
Dara Weiss   <i>Research: 2D molecular frameworks, stimuli-responsive devices</i>   <i>NSF GRFP Fellow</i>	Kempa Lab, 5 <sup>th</sup> year Ph.D. student	2018 – present
Reynolds Dziobek-Garrett   <i>Research: 2D atomic crystals, nano-optics, single-photon emission</i>	Kempa Lab, 4 <sup>th</sup> year Ph.D. student	2019 – present
Zhe Zhang   <i>Research: nanoparticle assembly and electrocatalysis</i>	Kempa Lab, 4 <sup>th</sup> year Ph.D. student	2019 – present
Ona Ambrozaite   <i>Research: 2D atomic crystals, nanoribbons, heterostructures</i>   <i>NSF GRFP Fellow</i>	Kempa Lab, 3 <sup>rd</sup> year Ph. D. student	2020 – present
Yifei Zhu   <i>Research: 2D molecular frameworks, gas-phase synthesis</i>	Kempa Lab, 3 <sup>rd</sup> year Ph. D. student	2021 – present
Kathryn Kingsbury   <i>Research: 2D molecular frameworks</i>	Kempa Lab, 2 <sup>nd</sup> year Ph. D. student	2021 – present
Sachi Hilliard   <i>Research: 2D atomic crystals, spectroscopy</i>	Kempa Lab, 2 <sup>nd</sup> year Ph. D. student	2021 – present

### Current Undergraduate Students (1):

Ms. Shreya Sriramineni	Kempa Lab, Junior student	2021 – present
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### Former Graduate Students (6):

Dr. Tomojit Chowdhury	University of Chicago <i>Kadanoff-Rice Postdoc Fellow</i> <i>with Prof. Jiwoong Park</i>	in Kempa Lab 2015 – 2021
Dr. Erick Sadler	Laboratory for Physical Sciences <i>NRC Postdoc Fellow</i>	in Kempa Lab 2016 – 2021
Dr. Francis Jamie Claire	Cree LED <i>Research Scientist III</i>	in Kempa Lab 2016 – 2021
Dr. Benjamin O. Stephens	Science Policy Associate <i>Irish Consulate, Boston</i>	in Kempa Lab 2016 – 2021
Mr. Eric Thompson	Thermo Fisher Science <i>R&amp;D Scientist</i>	in Kempa Lab 2016 – 2020
Mr. Zhenya Luo		in Kempa Lab 2019 – 2021

### Former Postdocs (3):

Dr. Marina Solomos	Merck & Co Inc. – New Jersey <i>Research Scientist</i>	in Kempa Lab 2018 – 2020
Dr. Jungkil Kim	Jeju National University <i>Assistant Professor</i>	in Kempa Lab 2018 – 2019
Dr. Minyuan Miller Li	Pacific Northwest National Lab <i>Postdoc Research Associate</i>	in Kempa Lab 2015 – 2017

### Former Undergraduate Students (9):

Ms. Yuzuka Karube	Columbia University <i>PhD Student</i>	in Kempa Lab 2018 – 2021
Mr. Louie Hoffenberg	Princeton University <i>PhD Student</i>	in Kempa Lab 2018 – 2021
Mr. Andrew Patera	SUNY Downstate <i>MD/PhD Student</i>	in Kempa Lab 2017 – 2019
Mr. Adam Strickland	Northwestern University <i>PhD Student</i>	in Kempa Lab 2017 – 2019
Ms. Stephanie Tenney	UCLA <i>PhD Student</i>	in Kempa Lab 2017 – 2019
Mr. Alex Kossak	MIT <i>PhD Student</i>	in Kempa Lab 2015 – 2018
Mr. Guillermo Contreras	University of Pennsylvania <i>PhD Student</i>	in Kempa Lab 2015 – 2017
Ms. Irina Chirca	Cambridge University <i>PhD Student</i>	in Kempa Lab 2016 – 2017
Ms. Imogen Weatherhead	Merck Group – Geneva <i>Project Associate Director</i>	in Kempa Lab 2015 – 2016

**Kempa Student PhD Theses Advised (4):**

Dr. Tomojit Chowdhury <u>PhD Thesis</u> : <i>Rational design of low-dimensional materials with tunable optical properties</i>	Defense: April 13, 2021
Dr. Erick Sadler <u>PhD Thesis</u> : <i>Modulation and manipulation of transition metal dichalcogenides</i>	Defense: April 30, 2021
Dr. Francis Jamie Claire <u>PhD Thesis</u> : <i>Structurally and electronically responsive metal-organic frameworks assembled from a modular building unit</i>	Defense: March 17, 2021
Dr. Benjamin O. Stephens <u>PhD Thesis</u> : <i>Synthesis of nanoparticle heterostructures via host-guest interactions</i>	Defense: October 21, 2021

## MEMBERSHIPS & AFFILIATIONS

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- Member**
- American Chemical Society (Division of Inorganic Chemistry, Division of Colloid & Surface Chemistry, Division of Physical Chemistry)
  - Materials Research Society
  - Johns Hopkins Environment, Energy, Sustainability, and Health Institute
  - Johns Hopkins Ralph S. O'Connor Sustainable Energy Institute (ROSEI)

## COLLABORATORS

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Prof. Michael Crommie	University of California Berkeley, Department of Physics
Prof. Hong-Gyu Park	Korea University, Department of Physics
Prof. Deep Jariwala	University of Pennsylvania, Dept of Electrical and Systems Engineering
Prof. Sarah King	University of Chicago, Department of Chemistry
Prof. Libai Huang	Purdue University, Department of Chemistry
Dr. Rhonda Stroud	Naval Research Laboratory
Dr. Todd Brintlinger	Naval Research Laboratory
Prof. Anthony Shoji Hall	Johns Hopkins University, Dept of Materials Science and Engineering
Prof. Michael Tsapatsis	Johns Hopkins University, Department of Chemical Engineering

## ACADEMIC STANDING

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Refereed Publications	36
Citations	7634
Books	2
Patents	5
<i>h</i> -index	20
i10-index	24

## FUNDING

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*Summary of Funding:* **\$2,447,660** (total funds raised, includes direct and indirect), **3** federal awards, **1** private foundation award, **1** industry award, **4** JHU awards