

## Curriculum Vitae – Georgiy Akopov

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### PROFESSIONAL POSITIONS

- Assistant Professor, Department of Chemistry, Rutgers University – Newark, NJ 2022-present

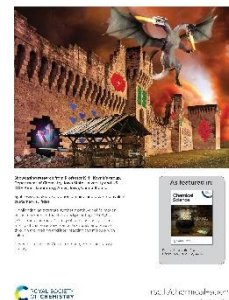
### EDUCATION & EXPERIENCE

- Spedding Postdoctoral Fellow, Ames National Lab, US DOE, Ames, IA 2019-2022
- Postdoctoral Fellow, Department of Chemistry, Iowa State University, Ames, IA 2018-2019  
*Advisor: Kirill Kovnir*
- PhD in Chemistry, University of California, Los Angeles (UCLA), CA 2014-2018  
*Advisor: Richard B. Kaner*
- BA in Chemistry (*Summa Cum Laude*), Rutgers University - Newark, NJ 2012-2014  
Minor: Mathematics; Degree certified by the American Chemical Society (ACS)  
*Advisors: Jenny Lockard & Roger A. Lalancette*

### PUBLICATIONS § equal contribution

1. Huaijun Sun, Chao Zhang, Weiyi Xia, Ling Tang, Renhai Wang, **Georgiy Akopov**, Nethmi W. Hewage, Kai-Ming Ho, Kirill Kovnir, Cai-Zhuang Wang [Machine Learning-Guided Discovery of Ternary Compounds Containing La, P, and Group 14 Elements](#) *Inorg. Chem.* **2022**, 61, 42, 16699–16706
2. Cheng-Wei Lin, Logan A. Stewart, Sichen Zhao, **Georgiy Akopov**, Reza Mohammadi, Michael T. Yeung, Paul S. Weiss, Richard B. Kaner [Effective Liquid Metal Seeds for Silver Nanovines](#) *Z. Anorg. Allg. Chem.* **2022**, e202200067
3. **Georgiy Akopov**, Nethmi W. Hewage, Gayatri Viswanathan, Philip Yox, Kui Wu, Kirill Kovnir [Non-Linear Optical Properties of the \(RE\)<sub>3</sub>CuGeS<sub>7</sub> Family of Compounds](#) *Z. Anorg. Allg. Chem.* **2022**, e202200096
4. **Georgiy Akopov**, Gayatri Viswanathan, Nethmi W. Hewage, Philip Yox, Kui Wu, Kirill Kovnir [Pd and Octahedra Do Not Get Along: Square Planar \[PdS<sub>4</sub>\] Units in Non-Centrosymmetric La<sub>6</sub>PdSi<sub>2</sub>S<sub>14</sub>](#) *J. Alloys Compd.* **2022**, 902, 163756
5. Shannon Lee, Gayatri Viswanathan, Scott Carnahan, Colin Harmer, **Georgiy Akopov**, Aaron Rossini, Gordon Miller, Kirill Kovnir [Add a Pinch of Tetrel: The Transformation of a Centrosymmetric Metal into a Nonsymmorphic and Chiral Semiconductor](#) *Chem. Eur. J.* **2021**, e202104319

6. **Georgiy Akopov**, Nethmi W. Hewage, Philip Yox, Gayatri Viswanathan, Shannon J. Lee, Liam P. Hulsebosch, Sarah D. Cady, Alexander L. Paterson, Frédéric A. Perras, Wenqian Xu, Kui Wu, Yaroslav Mudryk, Kirill Kovnir [Synthesis-Enabled Exploration of Chiral and Polar Multivalent Quaternary Sulfides](#)  
*Chem. Sci.* **2021**, 12, 14718-14730  
[Cover Image](#)

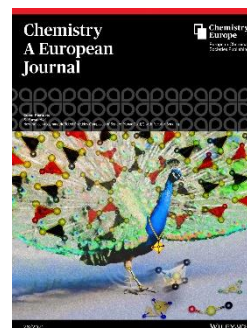


7. **Georgiy Akopov**§, Justin Mark§, Gayatri Viswanathan§, Shannon J. Lee, Brennan C. McBride, Juyeon Won, Frédéric A. Perras, Alexander L. Paterson, Adedoyin N. Adeyemi, Feng Zhang, Cai-Zhuang Wang, Kai-Ming Ho, Gordon J. Miller, Kirill Kovnir [Third time's the charm: Intricate non-centrosymmetric polymorphism in  \$\text{LnSiP}\_3\$  \( \$\text{Ln} = \text{La}\$  and  \$\text{Ce}\$ \) induced by distortions of phosphorus square layers](#)  
*Dalton Trans.* **2021**, 50, 6463-6476  
[Cover Image](#)



8. Shannon Lee, Scott Carnahan, **Georgiy Akopov**, Philip Yox, Lin-Lin Wang, Aaron Rossini, Kui Wu, Kirill Kovnir [Noncentrosymmetric Tetrel Pnictides  \$\text{RuSi}\_4\text{P}\_4\$  and  \$\text{IrSi}\_3\text{P}\_3\$ : Nonlinear Optical Materials with Outstanding Laser Damage Threshold](#)  
*Adv. Funct. Mater.* **2021**, 31, 2010293

9. Shannon J Lee, Juyeon Won, Lin-Lin Wang, Dapeng Jing, Colin P Harmer, Justin Mark, **Georgiy Akopov**, Kirill Kovnir [Novel Noncentrosymmetric Tetrel Pnictides composed of Square-Planar Au \(I\) with Peculiar Bonding](#)  
*Chem. Eur. J.* **2021**, 27, 7383-7390  
[Cover Image](#)



10. **Georgiy Akopov**, Gayatri Viswanathan, Kirill Kovnir [Synthesis, Crystal and Electronic Structure of  \$\text{La}\_2\text{SiP}\_4\$](#)   
*Z. Anorg. Allg. Chem.* **2021** 647, 91-97
11. **Georgiy Akopov**, Wai H. Mak, Dimitrios Koumoulis, Hang Yin, Bryan Owens-Baird, Michael T. Yeung, Mit H. Muni, Shannon Lee, Inwhan Roh, Zachary C. Sobell, Paula L. Diaconescu, Reza Mohammadi, Kirill A. Kovnir and Richard B. Kaner [Synthesis and Characterization of Single Phase Metal Dodecaboride Solid Solutions:  \$\text{Zr}\_{1-x}\text{Y}\_x\text{B}\_{12}\$  and  \$\text{Zr}\_{1-x}\text{U}\_x\text{B}\_{12}\$](#)   
*J. Am. Chem. Soc.* **2019**, 141(22), 9047-9062
12. Jialin Lei, **Georgiy Akopov**, Michael T. Yeung, Jinyuan Yan, Abby Kavner, Richard B. Kaner, and Sarah H. Tolbert [Radial X-Ray Diffraction Study of Superhard Early Transition Metal Dodecaborides under High Pressure](#)

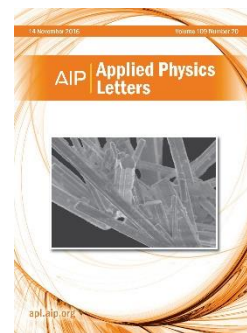
*Adv. Funct. Mater.* **2019**, 29, 1900293

13. Lisa E. Pangilinan, Christopher L. Turner, **Georgiy Akopov**, Mackenzie Anderson, and Richard B. Kaner [Superhard Tungsten Diboride-Based Solid Solutions](#)  
*Inorg. Chem.* **2018**, 57 (24), 15305–15313
14. **Georgiy Akopov**, Hang Yin, Inwhan Roh, Lisa E. Pangilinan, Michael T. Yeung, and Richard B. Kaner [Investigation of Hardness of Ternary Borides of the  \$YCrB\_4\$ ,  \$Y\_2ReB\_6\$ ,  \$Y\_3ReB\_7\$  and  \$YMo\_3B\_7\$  Types](#)  
*Chem. Mater.* **2018**, 30 (18), 6494–6502
15. **Georgiy Akopov**§, Lisa E. Pangilinan§, Reza Mohammadi, Richard B. Kaner [Invited Perspective: Superhard Metal Borides - A Look Forward](#)  
*APL Materials* **2018**, 6, 070901  
Featured Article *APL Materials*; Highlighted in [Scilight](#) 16 July 2018
16. **Georgiy Akopov**, Inwhan Roh, Zachary C. Sobell, Michael T. Yeung, and Richard B. Kaner [Investigation of Ternary Metal Dodecaborides  \$\(M\_1M\_2M\_3\)B\_{12}\$  \( \$M\_1, M\_2\$  and  \$M\_3 = Zr, Y, Hf\$  and  \$Gd\$ \)](#)  
*Dalton Trans.* **2018**, 47, 6683–6691  
[Cover Image](#)
17. **Georgiy Akopov**, Michael T. Yeung, Inwhan Roh, Zachary C. Sobell, Hang Yin, Wai H. Mak, Saeed I. Khan, and Richard B. Kaner [Effects of Dodecaboride Forming Metals on the Properties of Superhard Tungsten Tetraboride](#)  
*Chem. Mater.* **2018**, 30(10), 3559–3570
18. **Georgiy Akopov**, Michael T. Yeung, Inwhan Roh, Zachary C. Sobell, Lisa Pangilinan, Christopher L. Turner, and Richard B. Kaner [Effects of Variable Boron Concentration on the Properties of Superhard Tungsten Tetraboride](#)  
*J. Am. Chem. Soc.*, **2017** 139 (47), 17120–17127
19. Cheng-Wei Lin, Rebecca L. Li, Shauna Robbennolt, Michael T. Yeung, **Georgiy Akopov**, Richard B. Kaner [Furthering Our Understanding of the Doping Mechanism in Conjugated Polymers Using Tetraaniline](#)  
*Macromolecules* **2017**, 50 (15), 5892–5897
20. **Georgiy Akopov**§, Michael T. Yeung§, Richard B. Kaner [Review Article: Rediscovering the Crystal Chemistry of Borides](#)



*Adv. Mater.* **2017**, 29(21), 1604506

21. Michael T. Yeung, **Georgiy Akopov**, Cheng-Wei Lin, Daniel J. King, Rebecca L. Li, Zachary C. Sobell, Reza Mohammadi, Richard B. Kaner [Superhard  \$W\_{0.5}Ta\_{0.5}B\$  nanowires prepared at ambient pressure](#)  
*Appl. Phys. Lett.* **2016**, 109 (20), 203107  
Cover image 14 November 2016, Editor's Pick, featured by APL



22. **Georgiy Akopov**§, Zachary C. Sobell§, Michael T. Yeung, Richard B. Kaner [Stabilization of  \$LnB\_{12}\$  \( \$Ln = Gd, Sm, Nd, and Pr\$ \) in  \$Zr\_{1-x}Ln\_xB\_{12}\$  under Ambient Pressure](#)  
*Inorg. Chem.* **2016**, 55 (23), 12419–12426
23. **Georgiy Akopov**, Michael T. Yeung, Zachary C. Sobell, Christopher L. Turner, Cheng-Wei Lin, Richard B. Kaner [Superhard Mixed Metal Dodecaborides](#)  
*Chem. Mater.* **2016**, 28 (18), 6605-6612
24. **Georgiy Akopov**, Michael T. Yeung, Christopher L. Turner, Rebecca L. Li, and Richard B. Kaner [Stabilization of  \$HfB\_{12}\$  in  \$Y\_{1-x}Hf\_xB\_{12}\$  Under Ambient Pressure](#)  
*Inorg. Chem.* **2016**, 55 (10), 5051-5055
25. **Georgiy Akopov**, Michael T. Yeung, Christopher L. Turner, Reza Mohammadi, and Richard B. Kaner [Extrinsic Hardening of Superhard Tungsten Tetraboride Alloys with Group 4 Transition Metals](#)  
*J. Am. Chem. Soc.*, **2016**, 138 (17), 5714–5721  
[Highlight](#)

## BOOK CHAPTERS

1. Lisa E. Pangilinan, Shanlin Hu, **Georgiy Akopov**, Sabina C. Cabrera, Michael T. Yeung, Reza Mohammadi, Sarah H. Tolbert, and Richard B. Kaner (2021). [Superhard Materials: Advances in the Search and Synthesis of New Materials](#) In *Encyclopedia of Inorganic and Bioinorganic Chemistry*, R.A. Scott (Ed.).

## PATENTS

1. [Binder composition of tungsten tetraboride and abrasive methods thereof](#) Pat. No.: US11,033,998 B2
2. [Metal borides and uses thereof](#) Pat. No.: US 2019/0135646A1
3. [Mixed metal dodecaborides and uses thereof](#) Pat. No.: US11,168,001 B2

## AWARDS & HONORS

- Spedding Postdoctoral Fellowship, Ames National Lab 2019-2022
- ACS Division of Inorganic Chemistry Young Investigator Award 2019
- Dissertation Year Fellowship, UCLA 2018

- Inorganic Chemistry Dissertation Award, UCLA 2018
- Faculty Award for Innovation in Inorganic Chemistry, UCLA 2018
- 2018 Thermo Fisher Scientific Tony EM Image Awards, ThermoFisher Scientific, UCLA 2018
- 2018 MNA Best SEM Image, 1<sup>st</sup> Place, MSED & CIA, UCLA 2018
- Safety Theory Recognition Award, UCLA 2018
- Certificate of Advanced Laboratory Safety Training, EH&S, UCLA 2018
- NSF DMR Creativity Extension 2018-2020
- ACS-DIC Student Travel Award 2017
- ACS UCLA Research Showcase Fellowship 2017
- Harold A. Fales Memorial Award, Rutgers-Newark 2014
- Phi Theta Kappa Honor Society Scholarship, Rutgers-Newark 2012 - 2014

## CONFERENCE PAPERS AND PRESENTATIONS

1. Gayatri Viswanathan\*, **Georgiy Akopov**, Justin Mark, Gordon Miller, Kirill Kovnir; “ Structure-Composition-Property Relationships in Noncentrosymmetric Silicon Arsenides”. Oral presentation at ACS Chicago, Chicago, IL. **Fall 2022**.
2. Gayatri Viswanathan\*, **Georgiy Akopov**, Justin Mark, Gordon Miller, Kirill Kovnir; “Square Net Distribution in Noncentrosymmetric Rare-Earth Silicon Pnictides”. Poster presentation at the GRS and GRC – Solid State Chemistry, Colby-Sawyer College, New London, NH. **Summer 2022**.
3. Nethmi Hewage\*, **Georgiy Akopov**, Kirill Kovnir; “Magnetic Properties of Polar Quaternary Sulfides”. Poster presentation at 2022 SACNAS Research Presentation in San Juan, Puerto Rico. **Fall 2022**.
4. **Georgiy Akopov\***, Nethmi Hewage, Philip Yox, Shannon Lee, Gayatri Viswanathan, Kirill Kovnir; “Non-centrosymmetric quaternary metal sulfides: Synthesis, structure, and properties”. Oral presentation at 2021 Virtual Pacificchem meeting. **Fall 2021**.
5. **Georgiy Akopov\***, Juyeon Won, Justin Mark, Kirill Kovnir; “Non-Centrosymmetric Metal Tetrel-Pnictides: Synthesis, Structure, and Properties”. Oral presentation at 2020 Virtual MRS Spring/Fall Meeting & Exhibit. **Fall 2020**.
6. **Georgiy Akopov\***, Richard B. Kaner; “Rediscovering the Crystal Chemistry of Higher Borides”. Invited talk at the ACS Division of Inorganic Chemistry Young Investigator Award Symposium at ACS San Diego, CA. **Fall 2019**
7. **Georgiy Akopov\***, Justin Mark, Brennan McBride, Kirill Kovnir; “Synthesis of Ternary Metal Tetrel-Pnictides using Arc-melted Precursors”. Poster presentation at ACS San Diego, CA. **Fall 2019**
8. **Georgiy Akopov\***, Hang Yin, Inwhan Roh, Lisa Pangilinan, Richard B. Kaner; “Investigation of Hardness of Ternary Borides of the YCrB<sub>4</sub>, Y<sub>2</sub>ReB<sub>6</sub>, Y<sub>3</sub>ReB<sub>7</sub> and YMo<sub>3</sub>B<sub>7</sub> Structural Types”. Poster presentation at GRC – Solid State Chemistry, Colby-Sawyer College, New London, NH. **Summer 2018**

9. Richard B. Kaner\*, **Georgiy Akopov**, Inwhan Roh, Zachary C. Sobell, Michael T. Yeung, Lisa Pangilinan; “Ternary Metal Dodecaborides ( $M_1M_2M_3$ )B<sub>12</sub> ( $M_1, M_2$  and  $M_3 = Zr, Y, Hf$  and  $Gd$ )”. Poster presentation at GRC – Solid State Chemistry, Colby-Sawyer College, New London, NH. **Summer 2018**
10. **Georgiy Akopov\***, Inwhan Roh, Zachary C. Sobell, Michael T. Yeung, Lisa Pangilinan, Christopher L. Turner, Saeed I. Khan, Richard B. Kaner; “Superhard tungsten tetraboride (WB<sub>4</sub>): effects of variable boron concentration and the dodecaboride forming metals on its properties”. Poster presentation at ACS New Orleans, New Orleans, LA. **Spring 2018**
11. **Georgiy Akopov\***, Michael T. Yeung, Zachary C. Sobell, Christopher L. Turner, Cheng-Wei Lin, Richard B. Kaner; “Superhard alloys of transition metal dodecaborides:  $Zr_{1-x}Y_xB_{12}$ ,  $Zr_{1-x}Sc_xB_{12}$  and  $Y_{1-x}Sc_xB_{12}$ ”. Poster presentation at ACS San Francisco, San Francisco, CA. **Spring 2017**
12. Richard B. Kaner\*, **Georgiy Akopov**, Michael T. Yeung, Jialin Lei, Christopher L. Turner, Reza Mohammadi, Sarah H. Tolbert; “Designing New Superhard Metal Borides”. Poster presentation at the Gordon Research Conference (GRC) – Solid State Chemistry, Colby-Sawyer College, New London, NH. **Summer 2016**
13. **Georgiy Akopov\***, Michael T. Yeung, Christopher L. Turner, Rebecca L. Li, Richard B. Kaner; “Stabilization of HfB<sub>12</sub> in  $Y_{1-x}Hf_xB_{12}$  under Ambient Pressure”. Poster presentation at the GRS and GRC – Solid State Chemistry, Colby-Sawyer College, New London, NH. **Summer 2016**
14. Michael T. Yeung\*, **Georgiy Akopov**, Reza Mohammadi, Richard B. Kaner; “Nanostructured Superhard Materials”. Oral presentation presented at ACS San Diego, San Diego, CA. **Spring 2016**
15. **Georgiy Akopov\***, Roger A. Lalancette, Ivan Bernal; “Investigation of the Structure and Hydrogen Bonding in Weak Acid - Weak Base Complexes of Hydrazine (N<sub>2</sub>H<sub>4</sub>) and Oxalic Acid (C<sub>2</sub>H<sub>2</sub>O<sub>4</sub>)”. Poster presentation at the annual Rutgers-Newark Research Day poster session, Rutgers-Newark, Newark, NJ. **Spring 2014**

## PROFESSIONAL SERVICES

Peer review for: *Accounts of Chemical Research, Advanced Materials, Advanced Functional Materials, Ceramics International, Chemistry of Materials, ChemPhysChem, European Journal of Inorganic Chemistry, Inorganic Chemistry, Journal of the American Ceramic Society, Journal of the American Chemical Society, Journal of Materials Chemistry A, Journal of Materials Research, Journal of Solid State Chemistry, Materials Research, Nature Communications, Nature Materials, Physical Chemistry Chemical Physics, Progress in Materials Science, RSC Advances, Science Advances, Zeitschrift für Metallkunde: International Journal of Materials Research.*

## GRANT WRITING EXPERIENCE

- Collaboration with Kovnir lab at ISU  
Helped secure NSF-EAGER grant totaling \$300,000
- Independent PI at Ames lab through Spedding Fellowship  
Wrote initial and renewal grants totaling \$630,000 over 3 years
- Leader of superhard subgroup in Kaner lab at UCLA  
*Wrote grants and acquired funding*

NSF-DMR and Creativity Extension totaling \$920,000 over 4 years

## **OUTREACH ACTIVITIES**

1. Ames Lab Regional High School Science Bowl, 2020, Ames Lab, Ames, IA  
*Science and Rules Judge;*
2. Ames Lab Regional Middle School Science Bowl, 2020, Ames Lab, Ames, IA  
*Science and Rules Judge;*
3. The 6th Graduate and Professional Student Research Conference, 2019, ISU, Ames, IA  
*Judge*
4. State Science and Technology Fair of Iowa, 2019, Ames, IA  
*Judge*
5. Ames Laboratory Regional High School Science Bowl, 2019, Ames Lab, Ames, IA  
*Science and Rules Judge;*
6. Ames Laboratory Regional Middle School Science Bowl, 2019, Ames Lab, Ames, IA  
*Science and Rules Judge;*
7. Exploring your Universe – outreach project for K-12 students  
*Assisted with lecture and demonstrations*

## **LABORATORY MENTEES**

### **Current Undergraduate Students**

- Nethmi Hewage, Department of Chemistry, Iowa State University

### **Former Undergraduate Students**

- Liam Hulsebosch, Current position: Undergraduate, Department of Physics, SUNY Buffalo State College;
- Juyeon Won, Current position: Graduate School, University of Illinois, Urbana-Champaign, Shoemaker Group
- Zachary C. Sobell, Current position: Graduate School, Univ. of Colorado Boulder, George Group
- Inwhan Roh, Current position: Graduate School, Univ. of California, Berkeley, Yang Group
- Hang Yin, Current position: Departmental Scholar, UCLA, Kaner and Alexandrova Groups

## **TEACHING ACTIVITIES**

1. Dept. of Chemistry, Rutgers University – Newark, Newark, NJ (2022-present)
  - a. CHEM413 – Inorganic Chemistry II – *taught lectures, developed class materials* (1 semester)
2. Dept. of Chemistry and Biochemistry, University of California, Los Angeles, CA (2014-2018)  
*As a Teaching Assistant, taught discussion sections, graded homework assignments, midterm and final exams.*
  - a. CHEM 180/280(Graduate) - Solid State Chemistry (3 quarters)
  - b. CHEM 171 - Intermediate Inorganic Chemistry (3 quarters)
  - c. CHEM 20A – General Chemistry I (1 quarter)
  - d. CHEM 14B - General Chemistry for non-Chemistry Majors II (1 quarter)
  - e. CHEM 14A – General Chemistry for non-Chemistry Majors I (1 quarter)