BIOGRAPHICAL SKETCH

NAME**:** Alexander A. Puretzky

POSITION TITLE & INSTITUTION: Senior R&D Staff, Oak Ridge National Laboratory

**EDUCATION AND TRAINING**

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| --- | --- | --- | --- | --- |
| INSTITUTION | LOCATION | MAJOR/AREA OF STUDY | DEGREE | YEAR |
| Institute of Physics and Technology  Institute of Physics and Technology  Institute of Spectroscopy  Institute of Chemical Physics | Moscow  Moscow  Troitsk  Moscow | Physics and Mathematics  Physics  Physics      Physics (Laser Spectroscopy) | B.S.  M.S.  Ph.D.    Doctorate | 1969  1971  1977    1989 |

**RESEARCH AND PROFESSIONAL EXPERIENCE**

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| --- | --- |
| **From – To**  2006–present  2003–2006  1999–2003  1995–1999    1992–1995  1989–1992  1971–1992 | **Position Title, Organization and Location**  Senior R&D Staff, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge TN  Research Professor, Department of Materials Science and Engineering, University of Tennessee, Knoxville  Research Associate Professor, Department of Materials Science and Engineering, University of Tennessee, Knoxville  Research Scientist, Oak Ridge National Laboratory (Supported by Oak Ridge Associated Universities) Oak Ridge TN  Visiting Scientist, Oak Ridge National Laboratory, Oak Ridge TN  Science Alliance Professor of Physics, Moscow Institute of Physics and Technology, Moscow, Russia  Research Scientist, Senior Scientist and Group Leader, Institute of Spectroscopy, Troitsk, Moscow, Russia |

PUBLICATIONS:

1. Sumner B. Harris, Yu-Chuan Lin, Alexander A. Puretzky, Liangbo Liang, Ondrej Dyck, Tom Berlijn, Gyula Eres, Christopher M. Rouleau, Kai Xiao, David B. Geohegan, “Real-Time Diagnostics of 2D Crystal Transformations by Pulsed Laser Deposition: Controlled Synthesis of Janus WSSe Monolayers and Alloys”, *ACS Nano,* **17***,* 2472−2486(2023).
2. Wonhee Ko, Zheng Gai, Alexander A. Puretzky, Liangbo Liang, Tom Berlijn, Jordan A. Hachtel, Kai Xiao, Panchapakesan Ganesh, Mina Yoon, and An-Ping Li, “Understanding heterogeneities in quantum materials”, Advanced Materials 2106909 (2022).
3. Yiling Yu, Gang Seob Jung, Chenze Liu, Yu-Chuan Lin, Christopher M. Rouleau, Mina Yoon, Gyula Eres, Gerd Duscher, Kai Xiao, Stephan Irle, Alexander A. Puretzky, David B. Geohegan, “Strain-Induced Growth of Twisted Bilayers during the Coalescence of Monolayer MoS2 Crystals”, *ACS Nano* **15**, 4504-4517 (2021).
4. Alexander A. Puretzky, Yu-Chuan Lin, Chenze Liu, Alex M. Strasser, Yiling Yu, Stela Canulescu, Christopher M. Rouleau, Kai Xiao, Gerd Duscher, David B. Geohegan,“*In situ* laser reflectivity to monitor and control the nucleation and growth of atomically-thin 2D materials”, *2D Mater.* **7**, 025048 (2020).
5. Yu-Chuan Lin, Chenze Liu,Yiling Yu,Yiyi Gu, Eva Zarkadoula, Mina Yoon, Alexander A. Puretzky, Liangbo Liang, Alex Strasser, Xiangru Kong, Harry M. Meyer, Matthias Lorenz, Matthew F. Chisholm,Ilia Ivanov, Christopher M. Rouleau,Gerd Duscher, Kai Xiao, David B. Geohegan, “Low energy implantation into transition metal dichalcogenide monolayers to form Janus structures”, *ACS Nano* **14**, 3896-3906 (2020).
6. Yiyi Gu, Hui Cai, Jichen Dong, Yiling Yu, Anna N. Hoffman, Chenze Liu, Akinola Oyedele, Yu-Chuan Lin, Alexander A. Puretzky, Gerd Duscher, Philip D. Rack, Christopher M. Rouleau, Xiangmin Meng, Feng Ding, David B. Geohegan,Kai Xiao,“2D palladium diselenide with strong in-plane optical anisotropy and high mobility grown by chemical vapor deposition”, *Adv.Mater.* **32**, 1906238 (2020).
7. Yiling Yu, Alexander W. Bataller, Robert Younts, Yifei Yu, Guoqing Li, Alexander A. Puretzky, David B. Geohegan, Kenan Gundogdu, and Linyou Cao, “Room-Temperature Electron−Hole Liquid in Monolayer MoS2”, *ACS Nano* 13, 10351-10358 (2019).
8. K. Wang, A. A. Puretzky, Z. Hu, B. R. Srijanto, X. Li, N. Gupta, H. Yu, M. Tian, M. Mahjouri-Samani, X. Gao, A. Oyedele, C. M. Rouleau, G. Eres, B. I. Yakobson, M. Yoon, K. Xiao, D. B. Geohegan, “Strain tolerance of two-dimensional crystal growth on curved surfaces”, *Sci. Adv.* 5, eaav4028 (2019).
9. Akinola D. Oyedele, Shize Yang, Tianli Feng, Amanda V. Haglund, Yiyi Gu, Alexander A. Puretzky, Dayrl Briggs, Christopher M. Rouleau, Matthew F. Chisholm, Raymond R. Unocic, David Mandrus, Harry M. Meyer, Sokrates T. Pantelides, David B. Geohegan, Kai Xiao, “Defect-Mediated Phase Transformation in Anisotropic Two-Dimensional PdSe2 Crystals for Seamless Electrical Contacts”, *J. Am. Chem. Soc.* 141, 8928-8936 (2019).
10. Alexander A. Puretzky, Akinola Oyedele, Kai Xiao, Amanda V. Haglund, Bobby G. Sumpter, David Mandrus, David B. Geohegan, Liangbo Liang, “Anomalous interlayer vibrations in strongly coupled layered PdSe2”, *2D Mater.* **5**, 035016 (2018).

**PATENTS:**

1. “Two dimensional heterostructure materials”, D. B. Geohegan, C.M. Rouleau, K. Wang, K. Xiao, Ming-Wei Lin, A.A. Puretzky, M. Mahjouri-Samani, U.S. Patent No. **9,964,846 B2**, Issued: May 8, 2018.
2. “Luminescent Systems Based on the Isolation of Conjugated PI Systems and Edge Charge Compensation with Polar Molecules on a Charged Nanostructured Surface”, I.N. Ivanov, A.A. Puretzky, B. Zhao, D. B. Geohegan, D.J. Styers-Barnett, H. Hu, U.S. Patent No. **8,778,226 B2**, Issued: July 15, 2014.
3. “Transparent Conductive Nano-Composites,” D.B. Geohegan, I.N. Ivanov, A.A. Puretzky, S. Jesse, B. Hu, M. Garrett, B. Zhao, U.S. Patent No. **7,923,922 B2**, Issued: April 12, 2011.
4. “Condensed Phase Conversion and Growth of Nanorods and Other Materials Instead of From Vapor”, D.B. Geohegan, R.D. Seals, A.A. Puretzky, X. Fan, U.S. Patent No. **7,815,973 B2**, Issued: Oct. 19, 2010.
5. “Fabrication of High Thermal Conductivity Arrays of Carbon Nanotubes and Their Composites,” D.B. Geohegan, I.N. Ivanov, A.A. Puretzky, U.S. Patent No. **7,763,353 B2**, Issued: July 27, 2010.

**SYNERGISTIC ACTIVITIES**:

1. Invited speaker and session chair at numerous conferences spanning fundamental growth workshops and applications (APS March meeting 2017, Guadalupe SWNT Growth mechanisms workshop, MRS, SPIE Photonics West, International Conference on Laser Ablation, ...) reflecting fundamental synthesis and characterization of nanotubes, nanoparticles, graphene and emerging 2D materials.
2. Reviewer for Peer-Reviewed Journals: Nano Letters, ACS Nano, Physical Review Letters, Physical Review B, Applied Physics Letters, Carbon and others.
3. 2017 CNMS Distinguished Scientific Paper Award.
4. 2018 UT-Battelle Distinguished Researcher Award in Science and Technology.
5. 2020 UT-Battelle Outstanding Scholarly Output Award.

**Graduate and Postdoctoral Advisors and Advisees**:

**Graduate Advisor:** Dr. R.V. Ambartzumian Laser Spectroscopy Division, Institute of Spectroscopy, Troitsk (now at Lebedev Physics Institute, Moscow, Russia)

**Postdoctoral Advisor:** Prof. V.S. Letokhov, Institute of Spectroscopy, Troitsk, Moscow, Russia

**Thesis Advisor and Postgraduate-Scholar Sponsor:**

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