PhD. SEOK-KYUN SON (Assistant Professor)

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JOB

2023 - Current	**Kyung Hee University, Department of Physics, Korea, Republic of** Assistant Professor
2019 - 2023	**Mokpo National University, Department of Semiconductor & Applied Physics, Korea, Republic of** Assistant Professor
2015 - 2019	**National Graphene Institute, School of Physics and Astronomy, The University of Manchester, UK** Research associate

EDUCATION

2008 - 2014	**University of Cambridge, UK** PhD in Physics (admitted to the degree of PhD on 24 JANUARY 2015) **Thesis: *"Electron transport by Surface Acoustic Waves* (*SAWs*) *in an undoped system"*: A potential single-photon source with a GHz range**
1999 - 2006	**Pusan National University, Republic of Korea** BSc in Physics Honour Student (2003 – 2005) Ranked as second upon graduation (Course of study was prolonged to accommodate two years of military service)

RESEARCH

2023 - Current — **Kyung Hee University, Department of Physics, Korea, Republic of**
Project: Quantum Acoustics

- Quantum transducer for generation of single photon source
- Application of single photon source: quantum cryptography
- Producing piezoelectric single crystals of 2D materials

2019 - 2023 — **Mokpo National University, Department of Physics, Korea, Republic of**
Project: Nanoelectronics with 2D materials

- Optoelectronics for light emission semiconductor devices
- Device development based on ABC graphite for a band gap engineering
- Advanced nanofabrication with 2D materials and III-V compound semiconductor

2015 - 2019 — **National Graphene Institute, School of Physics and Astronomy, The University of Manchester, UK**
Research associate (Advisor: Dr. Artem Mishchenko and **Prof. Kostantin Novoselov, Novel Prize winner in 2010**)
Project: *Electrical and optical characterisation of 2D crystals and van der Waals materials.*

- Optoelectronics for ultrafast light emission devices (graphene light bulb)
- Device optimization for basic properties of ABC graphite films

2014 - 2015 Research associate (Advisor: Prof. Cinzia Casiraghi and **Prof. Kostantin Novoselov, Novel Prize winner in 2010**)
Project: *Raman spectroscopy for graphene and hexagonal boron nitride (h-BN) heterostructures.*

- Black phosphorus field-effect transistor devices
- Emergence of Superlattice Dirac points in graphene aligned with h-BN
- Monitoring dopants by Raman spectroscopy in an electrostatically back-gated graphene/h-BN transistor
- Bio compatible 2D crystal Ink-jet printed heterostructures

2008 - 2014 **Semiconductor Physics Group, Cavendish Laboratory, Department of Physics, University of Cambridge, UK**
PhD candidate (Advisor/Supervisor: Prof. Chris Ford)
Project: *Surface acoustic wave* (*SAW)-driven luminescence from a lateral n-p junction in a GaAs/AlGaAs quantum well*

- Optimization of piezoelectric property for enhanced SAW pumping
- Fabrication of SAW-driven single-electron devices comprising quasi-one-d imensional channels and n-p junctions
- Electrical measurement of SAW devices at 4K and 300mK

AWARDS & SCHOLARSHIPS

2013	Research fund, Semiconductor Physics Group, Cavendish Laboratory, Department of Physics, University of Cambridge, United Kingdom
2013	Research studentship, Parry Dutton Fund
2013	Research studentship grant awards, Cambridge Philosophical Society
2013	Research student fund, Institute of Physics (IOP)
2008-2011	Fully-funded PhD: Scholarship funded by Samyang Moolsan Ltd., in Korea
2003-2005	Academic Excellence Scholarship, Pusan National University

SELECTED JOURNAL ARTICLES

1. Do-Hoon Kim, Seung-il Lim, Hyun-Sik Hwang, Jun-Hui Choi, Seok-Ki Hyeong, Soheil Ghods, Hyeong Gi Park, Eui-Tae-Kim, Sukang Bae, Seoung-Ki Lee, **Seok-Kyun Son***, Jae-Hyun Lee*, Layer-engineered atomic-scale spalling of 2D van der Waals crystals, Ji-Yun Moon, *Matter*, **5** (11), 3935-3946 (2022)
2. Do-Hoon Kim, Jae-Hyun Lee, **Seok-Kyun Son***, Band-structure simulation for overlap wave functions between electrons and holes for recombination in undoped GaAs/AlGaAs heterostructures, *Journal of the Korean Physical Society*, **80**, 161-166 (2022)
3. Ji-Yun Moon, Minsoo Kim, Seung-Il Kim, Shuigang Xu, Jun-Hui Choi, Dongmok Whang, Kenji Watanabe, Takashi Taniguchi, Dong Seop Park, Juyeon Seo, Sung Ho Cho, **Seok-Kyun Son***, Jae-Hyun Lee, Layer-engineered large-area exfoliation of graphene, *Science Advances*, **4** (44), eabc6601 (2020)
4. Yanmmeng Shi, Shuigang Xu, Yaping Yang, Sergey Slizovskiy, Sergey V. Morozov, **Seok-Kyun Son**, Servet Ozdemir, Ciaran Mullan, Julien Barrier, Jun Yin, Alexey I. Berdyugin, Benjamin A. Piot, Takashi Taniguchi, Kenji Watanabe, Vladimir I. Fal'ko, Kostya S. Novoselov, A. K, Geim, and Artem Mishchenko, Electronic phase separation in multilayer rhombohedral graphite, *Nature*, **584** (7820), 210-214 (2020)

5. Tzu-Kan Hsiao, Antonio Rubino, Yousun Chung, **Seok-Kyun Son**, Hangtian Hou, Jorge Pedrós, Ateeq Nasir, Gabriel Éthier-Majcher, Megan J. Stanley, Richard T. Phillips, Thomas A. Mitchell, Jonathan P. Griffiths, Ian Farrer, David A. Ritchie, Christopher J. B. Ford, Single-photon emission from single-electron transport in a SAW-driven lateral light-emitting diode, *Nature Communications*, **11** (1), 917 (2020)
6. Yousun Chung, Hangtian Hou, **Seok-Kyun Son**, Tzu-Kan Hsiao, Ateeq Nasir, Antonio Rubino, Jonathan P. Griffiths, Ian Farrer, David A. Ritchie, Christopher J. B. Ford, Quantized charge transport driven by a surface acoustic wave in induced unipolar and bipolar junctions, *Physical Review B* **100** (24), 245401 (2019)
7. Ji-Yun Moon*, Seung-Il Kim*, **Seok-Kyun Son***, Seog-Gyun Kang, Jae-Young Lim, Dong Kyu Lee, Byungmin Ahn, Dongmok Whang, Hak Ki Yu, and Jae-Hyun Lee, Chemical vapor deposition: An eco-friendly, CMOS-compatible transfer process for large-scale CVD-graphene, *Advanced Materials Interfaces*, **6** (13), 1970084 (2019)
8. Jun Yin, Sergey Slizovskiy, Yang Cao, Sheng Hu, Yaping Yang, Inna Lobanova, Benjamin A. Piot, **Seok-Kyun Son**, Servet Ozdemir, Takashi Taniguchi, Kenji Watanabe, Kostya S. Novoselov, Francisco Guinea, A. K. Geim, Vladimir Fal'ko, and Artem Mishchenko, Dimensional reduction, quantum Hall effect and layer parity in graphite films, *Nature Physics*, **15** (5), 437-442 (2019)
9. Tataiana Latychevskaia*, **Seok-Kyun Son***, Yaping Yang, Dale Chancellor, Michael Brown, Servet Ozdemir, Ivan Madan, Gabriele Berruto, Fabrizio Carbone, Artem Mishchenko, and Kostya S. Novoselov, Stacking transition in rhombohedral graphite, *Frontiers of Physics*, **14** (1), 13608 (2019)
10. **S. Son***, J. Figueira Nunes, Y. Shin, J-H. Lee, and C. Casiraghi, The roughening kinetics of hydrogenated graphene, *Scientific Reports*, **8** (1), 8771 (2018)
11. **Seok-Kyun Son***, Makars Siskins*, Ciaran Mullan*, Jun Yin, Vasyl G Kravets, Aleksey Kozikov, Servet Ozdemir, Manal Alhazmi, Matthew Holwill, Kenji Watanabe, Takashi Taniguchi, Davit Ghazaryan, Kostya S Novoselov, Vladimir I Fal'ko, and Artem Mishchenko, Graphene hot-electron light bulb: incandescence from hBN-encapsulated graphene in air, *2D Materials*, **5** (1), 011006 (2017)
12. Daryl McManus, Sandra Vranic, Freddie Withers, Veronica Sanchez-Romaguera, Massimo Macucci, Huafeng Yang, Roberto Sorrentino, Khaled Parvez, **Seok-Kyun Son**, Giuseppe Iannaccone, Kostas Kostarelos, Gianluca Fiori, and Cinzia Casiraghi, Water-based and biocompatible 2D crystal inks for all-inkjet-printed heterostructures, *Nature Nanotechnology*, **12** (4), 343-350 (2017)

PATENT(RESISTRATION)

1. Jae-Young Sin, Tae-Ho Kim, Youngsoo Lee, Taehee Kim, Ju-Young Kim, **Seok-Kyun Son**, Do-Hoon Kim, Graphite structure and arrangement method having high magnetic flux density during induction heating (10-2020-0187889, LG Electronics Co., Ltd and Mokpo National University, 2020. 12. 30)
2. Jae-Young Sin, Sung-Hoon Sim, Jung-Hyung Ha, Youngsoo Lee, Tae-Ho Kim, Taehee Kim, **Seok-Kyun Son**, Do-Hoon Kim, Cooking appliance (10-2020-0122564, LG Electronics Co., Ltd and Mokpo National University, 2020. 09. 22)

REFERENCES

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