CURRICULUM VITAE

**Gil-Ho Kim**

**Office address:**

School of Electronic and Electrical Engineering

Sungkyunkwan University

Suwon 16419, South Korea

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**EDUCATION:**

**Ph.D.** Semiconductor Physics 1993~1998 University of Cambridge, UK

Thesis: “Magnetotransport in Low

Dimensional Semiconductor Structures”

**M.Ed.** Physics 1990~1992 Hanyang University, Korea

**B.S.** Physics 1981~1985 Hanyang University, Korea

**EXPERIENCE:**

**Sungkyunkwan University**, Suwon, Korea

*Professor,* School of Electronic and Electrical Engineering*,*

College of Information and Communication Engineering &

Sungkyunkwan Advanced Institute of Nanotechnology (SAINT) 2002.03 - present

**Electronics and Telecommunications Research Institute**, Daejeon, Korea 1999.02 - 2002.02

*Senior Researcher*

**PROFESSIONAL SOCIETIES:**

- The Korean Vacuum Society, Korea Nano Technology Research Society

- The Korean Institute of Electrical and Electronic Material Engineers, and The Korean Physical Society

- The Korean Institute of Electrical and Electronic Material Engineers

- American Physical Society

**RESEARCH INTERESTS:**

Nano semiconductor devices​

Qubit for a quantum computer in 2D semiconductor

Quantum transport in semiconductor

Single-electron (spin) transistor

Metal-Insulator transition with VO2 nanowire

Bose-Einstein condensation in 2D materials

**RECENT SELECTED JOURNALS:**

**“Dual-Channel WS2/WSe2 Heterostructure with Tunable Graphene Electrodes”**

Hanul Kim, Jihoon Kim, Inayat Uddin, Nhat Anh Nguyen Phan, Dongmok Whang\*, and **Gil-Ho Kim\***

*ACS Appl. Electron. Mater.* 5, 913−919 (2023)

**“MoTe2‑Based Schottky Barrier Photodiode Enabled by Contact Engineering”**

Inayat Uddin, Nhat Anh Nguyen Phan, Hai Yen Le Thi, Hanul Kim, Dongmok Whang, and **Gil-Ho Kim\***

*ACS Appl. Nano Mater.* 6, 445−452 (2023)

**“Self-Forming p–n Junction Diode Realized with WSe2 Surface and Edge Dual Contacts”**

Hai Yen Le Thi, Tien Dat Ngo, Nhat Anh Nguyen Phan, Won Jong Yoo, Kenji Watanabe, Takashi Taniguchi, Nobuyuki Aoki, Jonathan P. Bird, and **Gil-Ho Kim\***

*Small* 18 2204547 (2022)

**“Enhanced Performance of WS2 Field-Effect Transistor through Mono and Bilayer h-BN Tunneling Contacts”**

Nhat Anh Nguyen Phan, Hamin Noh, Jihoon Kim, Yewon Kim, Hanul Kim, Dongmok Whang, Nobuyuki Aoki, Kenji Watanabe, Takashi Taniguchi, and **Gil-Ho Kim\***

*Small* 2105753 (2022)

**“Schottky Diode with Asymmetric Metal Contacts on WS2”**

Jihoon Kim, A. Venkatesan, Nhat Anh Nguyen Phan, Yewon Kim, Hanul Kim,

Dongmok Whang, and **Gil-Ho Kim\***

*Adv. Electron. Mater.* 2100941 (2021)

**“Improved Contact Resistance by a Single Atomic Layer Tunneling Effect in WS2/MoTe2 Heterostructures”**

Jihoon Kim, A. Venkatesan, Hanul Kim, Yewon Kim, Dongmok Whang and **Gil-Ho Kim\***

*Advanced Science* **8**, 2100102 (2021)

**“Clean Interface Contact Using a ZnO Interlayer for Low-Contact-Resistance MoS2 Transistors”**

J. Jang, Y. Kim, SS Chee, H. Kim, D. Whang, **Gil-Ho Kim\***, and SJ Yun\*

*ACS Appl. Mater. Interfaces* **12**, 5031 (2020)

**“Tunable Electron and Hole Injection Enabled by Atomically Thin Tunneling Layer for Improved Contact Resistance and Dual Channel Transport in MoS2/WSe2 van der Waals Heterostructure”**

Muhammad Atif Khan, Servin Rathi, Changhee Lee, Dongsuk Lim, Yunseob Kim, Sun Jin Yun, Doo-Hyeb Youn, and **Gil-Ho Kim\***

*ACS Appl. Mater. Interfaces* **10** 23961 (2018)

**“Observation of negative differential resistance in mesoscopic graphene oxide devices”**

Servin Rathi, Inyeal Lee, Moonshik Kang, Dongsuk Lim, Yoontae Lee, SerhanYamacli, Han-Ik Joh, Seongsu Kim, Sang-Woo Kim, Sun Jin Yun, Sukwon Choi & **Gil-Ho Kim\***

*Scientific Reports* **8** 7144 (2018)

**“Gate Tunable Self-Biased Diode Based on Few Layered MoS2 and WSe2”**

Muhammad Atif Khan, Servin Rathi, Dongsuk Lim, Sun Jin Yun, Doo-Hyeb Youn, Kenji Watanabe, Takashi Taniguchi, and **Gil-Ho Kim\***

*Chemistry of Materials* **30** 1011 (2018)

**“Large, non-saturating magnetoresistance in single layer chemical vapor deposition graphene with an h-BN capping layer”**

Chiashain Chuang, C.-T. Liang, **Gil-Ho Kim**, R.E. Elmquist, Y. Yang, Y.P. Hsieh, Dinesh K. Patel, K. Watanabe, T. Taniguchi, N. Aoki\*

*Carbon* **136** 211 (2018)

**“Hole dephasing caused by hole–hole interaction in a multilayered black phosphorus”**

Lijun Li, Muhammad Atif Khan, Yoontae Lee, Inyeal Lee, Sun Jin Yun, Doo-Hyeb Youn and **Gil-Ho Kim\***

*J. Phys.: Condens. Matter* **29** 435302 (2017)

**“Junctionless Diode Enabled by Self-Bias Effect of Ion Gel in Single Layer MoS2 Device”**

Muhammad Atif Khan, Servin Rathi, Jinwoo Park, Dongsuk Lim, Yoontae Lee, Sun Jin Yun, Doo-Hyeb Youn, and **Gil-Ho Kim\***

*ACS Appl. Mater. Interfaces* **9** 26983 (2017)

**“Tunable electrical properties of multilayer HfSe2 field effect transistors by oxygen plasma treatment”**

Moonshik Kang, Servin Rathi, Inyeal Lee, Lijun Li, Muhammad Atif Khan, Dongsuk Lim, Yoontae Lee, Jinwoo Park, Sun Jin Yun, Doo-Hyeb Youn, Chungsam Junb and **Gil-Ho Kim\***

*Nanoscale* **9** 1645 (2017)

**“Conductance fluctuations in high mobility monolayer graphene: Nonergodicity, lack of determinism and chaotic behavior”**

C. R. da Cunha, M. Mineharu, M. Matsunaga, N. Matsumoto, C. Chuang, Y. Ochiai, **G.-H. Kim**, K. Watanabe, T. Taniguchi, D. K. Ferry & N. Aoki\*

*Scientific Reports* **6** 33118 (2016)

**“Gate-tunable Hole and Electron Carrier Transport in Atomically Thin Dual-Channel WSe2/MoS2 Heterostructure for Ambipolar Field-Effect Transistor”**

Inyeal Lee, Servin Rathi, Dongsuk Lim, Lijun Li, Jinwoo Park, Yoontae Lee, Kyung Soo Yi, Krishna P. Dhakal, Jeongyong Kim, Changgu Lee, Gwan-Hyoung Lee, Young Duck Kim, James Hone, Sun Jin Yun, Doo-Hyeb Youn, and **Gil-Ho Kim\***

*Advanced Materials* **28** 9519 (2016)

**“P-doping and efficient carrier injection induced by graphene oxide for high performing WSe2 rectification devices”**

Muhammad Atif Khan, Servin Rathi, Inyeal Lee, Lijun Li, Dongsuk Lim,Moonshik Kang, and **Gil-Ho Kim\***

*Applied Physics Letters* **108** 093104 (2016)

**“Tunable Electrical and Optical Characteristics in Monolayer Graphene and Few-Layer MoS2 Heterostructure Devices”**

Servin Rathi, Inyeal Lee, Dongsuk Lim, Jianwei Wang, Yuichi Ochiai, Nobuyuki Aoki, Kenji Watanabe, Takashi Taniguchi, Gwan-Hyoung Lee, Young-Jun Yu, Philip Kim,and **Gil-Ho Kim**\*

*Nano Lett.* **15** 5017−5024 (2015)

**“Electrical characterization of multilayer HfSe2 field-effect transistors on SiO2 substrate”**

Moonshik Kang, Servin Rathi, Inyeal Lee, Dongsuk Lim, Jianwei Wang, Lijun Li, Muhammad Atif Khan, and **Gil-Ho Kim\***

*Applied Physics Letters* **106** 143108 (2015)

**“Alternating Current Dielectrophoresis Optimization of Pt-Decorated Graphene Oxide Nanostructures for Proficient Hydrogen Gas Sensor”**

Jianwei Wang, Servin Rathi, Budhi Singh, Inyeal Lee, Han-Ik Joh, and **Gil-Ho Kim\***

*ACS Appl. Mater. Interfaces* **7** 13768−13775 (2015)

**“Dielectrophoretic assembly of Pt nanoparticle-reduced graphene oxide nanohybrid for highly-sensitive multiple gas sensor”**

Jianwei Wang, Servin Rathi, Budhi Singh, Inyeal Lee, Sunglyul Maeng, Han-Ik Joh, and **Gil-Ho Kim∗**

*Sensors and Actuators B* **220** 755–761 (2015)

**“Dielectrophoresis of graphene oxide nanostructures for hydrogen gas sensor at room temperature”** Jianwei Wang, Budhi Singh, Jin-Hyung Park, Servin Rathi, In-yeal Lee, Sunglyul Maeng, Han-Ik Joh, Cheol-Ho Lee, and **Gil-Ho Kim**

*Sensors and Actuators B* **194** 296– 302 (2014)

**“Conductance Control in VO2 Nanowires by Surface Doping with Gold Nanoparticles”**

**Gil-Ho Kim,\*** Youngreal Kwak, Inyeal Lee, Servin Rathi, Jeong Min Baik, and Kyung Soo Yi

*ACS Appl. Mater. Interfaces* **6** 14812−14818 (2014)

**“Poly-4-vinylphenol and poly(melamine-coformaldehyde)-based graphene passivation method for flexible, wearable and transparent electronics”**

In-yeal Lee, Hyung-Youl Park, Jin-hyung Park, Gwangwe Yoo, Myung-Hoon Lim, Junsung Park, Servin Rathi, Woo-Shik Jung, Jeehwan Kim, Sang-Woo Kim, Yonghan Roh, **Gil-Ho Kim\*** and Jin-Hong Park\*

*Nanoscale* **6** 3830 (2014)

**“Dielectrophoresis of graphene oxide nanostructures for hydrogen gas sensor at room temperature”**

Jianwei Wang, Budhi Singh, Jin-Hyung Park, Servin Rathi, In-yeal Lee, Sunglyul Maeng, Han-Ik Joh, Cheol-Ho Lee, and **Gil-Ho Kim\***

*Sensors and Actuators B: Chemical* **194** 296-302 (2014)

**PREVIOUS SELECTED PHYSICS JOURNALS:**

**“Effect of particle size on the magnetic properties of NixCo1xFe2O4 (x0.3) nanoparticles”**

K. Maaz, S. Karim, & **Gil-Ho Kim,\***

*Chemical Physics Letters* **549**, 67 (2012)

**“Effect of aging on the magnetic characteristics of nickel nanowires**

**embedded in polycarbonate”**

K. Maaz,1,2 S. Ishrat,1 S. Karim, & **Gil-Ho Kim,\***

*Journal of Applied Physics* **110**, 13908 (2011)

**“Hopping conduction and magnetoresistance of a GaAs*/*Al*x*Ga1−*x*As quantum well with embedded InAs dots”**

L. Li, **Gil-Ho Kim\***, K. J. Thomas, and D. A. Ritchie

*Physical Review B* **83**, 153304 (2011)

**“Charge trapping in quantum dot memory devices with different dot densities”**

E S Kannan, **Gil-Ho Kim\*** and D A Ritchie

*J. Phys. D: Appl. Phys.* **43**, 225101(2010)

**“Crossover from negative to positive magnetoresistance in the double quantum well system with different starting disorder”**

E S Kannan, M Karamad, **Gil-Ho Kim\***, I Farrer and D A Ritchie

*J. Phys.: Condens. Matter* **22**, 045802 (2010)

**“Assembly of gold nanoparticles of different diameters between nanogap electrodes”**

Donguk Cheon, Sanjeev Kumar, and **Gil-Ho Kim\***

*Applied Physic Letters* **96**, 013101 (2010)

**“Capacitance-voltage and current-voltage characteristics of graphite oxide thin films patterned by ultraviolet photolithography”**

In-yeal Lee, E. S. Kannan, and **Gil-Ho Kim\***

*Applied Physic Letters* **95**, 263308 (2009)

**“Memory characteristics of InAs quantum dots embedded in GaAs quantum well”**

E. S. Kannan, **Gil-Ho Kim\***, and D. A. Ritchie

*Applied Physic Letters* **95**, 143506 (2009)

**“Manipulation and trapping of semiconducting ZnO nanoparticles into nanogap electrodes by dielectrophoresis technique”**

Sanjeev Kumar, Young-Kyo Seo, and **Gil-Ho Kim**\*

*Applied Physic Letters* **94**, 153104 (2009)

**“From insulator to quantum Hall liquid at low magnetic fields”**

Tsai-Yu Huang, C.-T. Liang\*, **Gil-Ho Kim**, C. F. Huang, Chao-Ping Huang, Jyun-Ying Lin, Hsi-Sheng Goan, and D. A. Ritchie

*Physical Review B* **78**, 113305 (2008)

**“Dielectrophoretic Assembly of Single Gold Nanoparticle into Nanogap Electrodes”**

Seok-Hwang Yoon, Saiful I. Khondaker, Young-Suk Choi, T. W. Kim, Sanjeev Kumar,

**Gil-Ho Kim\***

*Journal of Nanoscience and Nanotechnology,* **7**, 3427 (2008)

**“Transport hysteresis in AlGaAs/GaAs double quantum well systems with InAs quantum dots”**

E.S. Kannan, **Gil-Ho Kim\***, I Farrer and D A Ritchie

*Journal of Physics-Condensed Matter*, **19,** 506207 (2007)

**“Mechanism of ultraviolet photoconductivity in zinc oxide nanoneedles”**

Sanjeev Kumar, **Gil-Ho Kim\***, K Sreenivas and R P Tandon

*Journal of Physics-Condensed Matter*, **19,** 472202(2007)

**“Short range scattering effect of InAs quantum dots in the transport properties of two-dimensional electron gas”**

E. S. Kannan, **Gil-Ho Kim\***, Sanjeev Kumar, I. Farrer, D. A. Ritchie, Jun Ho Son, Jeong Min Baik, Jong-Lam Lee, D. H. Youn, and Kwang-Yong Kang

*Applied Physics Letters*, **90,** 152110 (2007)

**“Experimental determination of electron and hole sublevels in modulation-doped lnAs/GaAs quantum dots”**

Y. D. Jang, J. S. Yim, D. Lee, **Gil-Ho Kim**, C.-T. Liang, I. Farrer, and D. A. Ritchie

*Applied Physics Letters*, **87**,201 (2005)

**“From localization to Landau quantization in a two-dimensional GaAs electron system containing self-assembled InAs quantum dots”**

**Gil-Ho Kim\***, C.-T. Liang, C. F. Huang, J. T. Nicholls, D. A. Ritchie, P. S. Kim, C. H. Oh, J. R. Juang, and Y. H. Chang

*Physical Review B*, **69**, 539 (2004)

**“Transport in a gated Al0.18Ga0.82N/GaN electron system”**

J. R. Juang, Tsai-Yu Huang, Tse-Ming Chen, Ming-Gu Lin, **Gil-Ho Kim**, Y. Lee, Chi-Te Liang, D. R. Hang, Y. F. Chen, Jen-Inn Chyi

*Journal of Applied Physics*, **94**, 3181 (2003)

**“Effective Potential Calculation in a Two-Dimensional Electron Gas Containing Quasi One-Dimensional AlAs Submonolayer”**

**Gil-Ho Kim\***, H.-S. Sim, M.Y. Simmons, C.-T. Liang, and D.A. Ritchie

*Journal of Physics-Condensed Matter*, **39**, 9515 (2001)

**“Transport properties of two-dimensional electron gases containing linear ordering InAs self-assembled quantum dots”**

**Gil-Ho Kim\***, D.A. Ritchie, C.-T. Liang, G.D. Lian, J. Yuan, M. Pepper, and L.M. Brown *Applied Physic Letters*, **78**, 3896 (2001)

**“Method of determining potential barrier heights at submonolayer AlAs/GaAs heterointerfaces”**

**Gil-Ho Kim\***, M.Y. Simmons, D.A. Ritchie, C.-T. Liang, A.C. Churchill, H.-S. Sim, K.J. Chang, G. Ihm, and N. Kim

*Physical Review B*, **64**, 161404(2001)

**“Tuning the insulator-quantum Hall liquid transitions in a two-dimensional electron gas using self-assembled InAs”**

**Gil-Ho Kim\***, J. T. Nicholls, S. I. Khondaker, I. Farrer, and D.A. Ritchie

*Physical Review B*, **16**, 10910 (2000)

**“Multilayered gated lateral quantum dot devices”**

C.-T. Liang, M.Y. Simmons, C.G. Smith, **Gil-Ho Kim**, D.A. Ritchie, and M. Pepper

*Applied Physics Letters*, **76**, 1134 (2000)

**“Spin-dependent transport in a clean one-dimensional channel”**

C.-T. Liang, M.Y. Simmons, C.G. Smith, **Gil-Ho Kim**, D.A. Ritchie, and M. Pepper

*Physical Review B*, **60**, 10687 (1999)

**“Transport properties of two-dimensional electron gases containing InAs self-assembled dots”**

**Gil-Ho Kim\***, D.A. Ritchie, M. Pepper, G.D. Lian, J. Yuan, and L.M. Brown

*Applied Physics Letters*, **73**, 2468 (1998)

**“Experimental evidence for Coulomb charging effects in an open quantum dot at zero magnetic field”**

C.-T. Liang, M.Y. Simmons, C.G. Smith, **Gil-Ho Kim**, D.A. Ritchie, and M. Pepper

*Physical Review Letters*, **81**, 3507 (1998)

**“Modification of InAs quantum dot structure by the growth of the capping layer”**

G.D. Lian, J. Yuan, L.M. Brown, **Gil-Ho Kim**, and D.A. Ritchie

*Applied Physics Letters*, **73**, 49 (1998)

**“Electron focusing in two-dimensional electron gases grown on (311)B GaAs substrates”**

A.C. Churchill, **Gil-Ho Kim**, M.Y. Simmons, D.A. Ritchie, and G.A.C. Jones

*Physical Review B*, **23**, 17636 (1994)