

OKI GUNAWAN

CURRICULUM VITAE

Research Staff Member
IBM T. J. Watson Research Center
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EDUCATION

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|-----------|---|-----------|
| 2000–2007 | Princeton University
<i>Ph.D. & M.A. in Electronics Material and Device, Dept. of Electrical Engineering.</i> | USA |
| 1998–2000 | Nanyang Technological University
<i>M.Eng. in Electrical and Electronics Engineering.</i> | Singapore |
| 1994–1998 | Nanyang Technological University
<i>B.Eng. with First Class Honours in Electrical and Electronics Engineering.</i> | Singapore |

PROFESSIONAL EXPERIENCE

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| 2008–now | Research Staff Member
IBM T. J. Watson Research Center, Yorktown Heights, NY |
| 2007–2008 | Postdoctoral scientist
IBM T. J. Watson Research Center, Yorktown Heights, NY |

HONORS AND AWARDS

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| 2020 | IBM Pat Goldberg Award, 2019 for “Carrier-Resolved Photo Hall effect”, Nature 575, 151 (2019)
Annual award for the best research paper from IBM Research labs world-wide. Only two were selected in 2019. |
| 2019 | Innovation Award, Agency of Assessment and Application of Technology Indonesia (BPPT)
National award in Indonesia for science and technology achievement. |
| 2018 | IBM Master Inventors 2019.
A select 46 out of 8,500 IBM inventors worldwide. |
| 2018 | IBM Invention Achievement Award - 15th Plateau |
| 2013 | Achmad Bakrie Award (Indonesia), Young scientist category |
| 2010 | IBM Patent Challenge Award, Honorable Mention |
| 2000 | AT&T Leadership Award, Asia-Pacific |
| 1993 | Olympiad Bronze Medal
IPhO Special Prize for "Top student of each country"
XXIV International Physics Olympiad, USA |

PROFESSIONAL & COMMUNITY SERVICE

- Reviewer for Physical Review Letter, Physical Review B, Applied Physics Letter, Advanced Energy Materials, Progress in Photovoltaics, Applied Surface Science, Thin Solid Films, Physica Status Solidi.
- Invited speaker for World Science Festival 2018, New York City, June 3, 2018.
- Author of experimental problem: "Parallel dipole line magnetic trap for earthquake and volcanic sensing", The 2017 International Physics Olympiad, Yogyakarta, Indonesia, July 2017.
- Author of experimental problem: "The wind power and its metrologies", The Asian Physics Olympiad, Bogor, Indonesia, May 2013.
- Deputy leader, Indonesian Physics Olympiad team (Tim Olimpiade Fisika Indonesia / TOFI), The 1999 International Physics Olympiad, Padova, Italy and The 2000 International Physics Olympiad, Lancaster, UK.
- Team leader, Indonesian Physics Olympiad team (TOFI), The 1st Asian Physics Olympiad, Karawaci, Indonesia (2000).

SELECTED PUBLICATIONS

Peer reviewed journal publications: >60.

1. O. Gunawan, S. R. Pae, D. M. Bishop, Y. Virgus, J. H. Noh, N. J. Jeon, Y. S. Lee, X. Shao, T. Todorov, D. B. Mitzi, B. Shin, "Carrier-resolved photo-Hall effect", **Nature** 575, 151 (2019).
2. O. Gunawan, Y. Virgus, "The one-dimensional camelback potential in the parallel dipole line trap: Stability conditions and finite size effect", **J. Appl. Phys.** 121 (13), 133902 (2017).
3. O. Gunawan, Y. Virgus, and T. K. Fai, "A parallel dipole line system", **Appl. Phys. Lett.** 106, 062407 (2015).
4. W. Wang, M. T. Winkler, O. Gunawan, T. Gokmen, T. K. Todorov, Y. Zhu, and D. B. Mitzi, "Device characteristics of CZTSSe thin film solar cell with 12.6% efficiency", **Adv. Ener. Mater.** 4, 1301465 (2014).
5. O. Gunawan, T. Gokmen, D. B. Mitzi, "Suns-Voc characteristics of high performance kesterite solar cells", **J. Appl. Phys.** 116, 084504 (2014).
6. T. Gokmen, O. Gunawan, T. K. Todorov, D. B. Mitzi, "Band tailing and efficiency limitation in kesterite solar cells", **Appl. Phys. Lett.** 103, 103506 (2013).
7. O. Gunawan, K. Vakili, T. Gokmen, E. P. De Poortere, M. Shayegan, "Spin-valley phase diagram of the two-dimensional metal insulator transition", **Nature Physics** 3, 388 (2007).
8. O. Gunawan, Y. P. Shkolnikov, K. Vakili, T. Gokmen, E. P. De Poortere, M. Shayegan, "Valley susceptibility of an interacting two-dimensional electron system", **Phys. Rev. Lett.** 97, 186 404 (2006).
9. O. Gunawan, E. P. De Poortere, M. Shayegan, "AlAs 2D electrons in an antidot lattice: Electron pinball with elliptical Fermi contours", **Phys. Rev. B** 75, R81304 (2007).
10. O. Gunawan, Y. P. Shkolnikov, E. P. De Poortere, E. Tutuc, and M. Shayegan, "Ballistic electron transport in AlAs quantum wells", **Phys. Rev. Lett.** 93, 246 603 (2004).
11. O. Gunawan, H. S. Djie, B. S. Ooi, "Electronics states of interdiffused quantum dots", **Phys. Rev. B** 71, 205 319 (2005).

SELECTED PATENTS

Granted patents in US and other countries: 63. Patents of the “Rotating Parallel Dipole Line Hall system” (no. 2 and no. 3) have been licensed and the technology is in production by Semilab in Hungary.

1. O. Gunawan, Q. Cao, “Magnetic trap for cylindrical diamagnetic materials,” **U.S. patent** 8,895,355 (2014), 9,093,377 (2015), 9,236,293 (2016), 9,263,669 (2016), 1,0128,152 (2018).
2. O. Gunawan, T. Gokmen, “Hall measurement system with rotating magnet,” **U.S. patent** 9,041,389 (2015).
3. O. Gunawan, M. Pereira, "Rotating magnetic field Hall measurement system", **US patent** 9,678,040 (2017); 9,772,385 (2017); 10,078,119 (2018); **Germany** 11 2016 000 875.9; **UK** 1717263.6; **Japan** 2017-552496.
4. O. Gunawan, "Electromagnetic trap cooling system with parallel dipole line trap", **US patent** 10,128,013 (2018).
5. O. Gunawan, "Voltage-tunable 1D electro-magnet potential and probe system with parallel dipole line trap", **US patent** 10,082,408 (2018).
6. O. Gunawan, "Parallel dipole line trap with variable gap and tunable trap potential", **US patent** 10,082,408 (2018).
7. O. Gunawan, "Parallel dipole line trap viscometer and pressure gauge", **US patent** 10,031,058 (2018).
8. O. Gunawan, "Solar cell characterization system with an automated continuous neutral density filter", **US patent** 8,797,058 (2014); 9,523,732 (2016); 9,660,577 (2017); 9,825,586 (2017).
9. O. Gunawan, "Calibration free distance sensor", **US patent** 9,651,353 (2017).
10. O. Gunawan, "Non-contact sheet conductivity measurements implementing a rotating magnetic braking system", **US patent** 9,103,653; 9,103,652 (2015).

SELECTED PRESENTATIONS

1. "Carrier-Resolved Photo Hall Effect: A 140 years-old secret in Hall effect and its application in world-record perovskite and kesterite solar cell", August 23, 2018, Korean Advanced Institute of Science and Technology (Invited).
2. "Minority carrier extraction study in high performance kesterite solar cell", International Union of Material Research Society (IUMRS) Daejeon, Korea, Aug 20 (2018). (Invited).
3. "Parallel Dipole Line Magnetic Trap for earthquake and volcanic sensing", The 2017 International Physics Olympiad, International Board Meeting, Experimental Problem Presentation, Yogyakarta, July 2017. (Invited).
4. "The parallel dipole line system, its "camelback" effect & fascinating applications: A novel electromagnetic trap & high sensitivity Hall system", Princeton University PRISM/PCCM Spring Seminar Series, April 20 (2016). (Invited).
5. "A High Sensitivity Rotating Parallel Dipole Line Hall System for Photovoltaics Research", Next Generation Materials for Solar Photovoltaics, Royal Society of Chemistry, London, January 13, (2016) (Invited).