CURRIRULUM VITAE

Assist. Prof. Santi Koonkarnkhai, Ph.D.

Department of Telecommunications Engineering, Faculty of Science and Technology,

Nakhon Pathom Rajabhat University (NPRU), Nakhon Pathom, Thailand

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EDUCATION

Nov, 2009 – Sep, 2014 King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. Doctor of Philosophy (Ph.D.) in Electrical Engineering major in Communication, Ph.D. Thesis; Correction of Insertion and Deletions Errors in Bit-Patterned Media Recording

May, 2009 – May, 2014 King Mongkut's University of Technology North Bangkok, Bangkok, Thailand. M.Eng. in Electrical Engineering major in Communication, Thesis; Algorithm for Thermal Asperity Detection and Correction in Magnetic Recording Channels

May, 2002 – Mar, 2005 King Mongkut's Institute of Technology North Bangkok, Bangkok, Thailand. B.Eng. in Electronics Engineering Technology

May, 2000 – Mar, 2002 Uthaithani Technical College, Uthaithani, Thailand. Certificate in Technical Education, major in Electronics

WORK EXPERIENCES

Nov 2018 – Present; Assistant Director for Research and Development Institute, NPRU

Oct 2018 – Present; Committee of Faculty of Science and Technology (Internal committee), NPRU

May 2018 – Present; Manager of Interdisciplinary Research Review (formerly known as: Journal of Thai Interdisciplinary Research)

Sep, 2016 – Present; Assistant Professor in Telecommunications Engineering, NPRU

Feb, 2015 – Jul, 2017 Head of Department of Telecommunications Engineering in Department of Telecommunications Engineering, NPRU

Nov, 2011 – Sep, 2016 Lecturer in Telecommunications Engineering Program, NPRU

Nov, 2011 – Oct, 2018; Researcher in Data Storage Technology Research Center, NPRU

Mar, 2012 – Jun, 2012 Internship; Department of Advanced Channel Failure Analysis (ACFA), Western Digital (WD) Thailand, Bang Pa-In Industrial Estate Ayutthaya, Thailand.

Mar, 2005 – May, 2005 Student Trainee; Caltex oil (Thailand) Limited. 576 Nanglinchee Rd. (Rama 3 Rd. Soi. 64) Chongnonsi Yannawa Bangkok, Thailand 10120.

SKILLS

Programming languages: C Programming, MATLAB, SCILAB

Software Packages: Excel, WinWord, PowerPoint.

PUBLICATIONS

PATENT: (สิทธิบัตร)

1. ปิยะ โควินท์ทวีวัฒน์ และ **สันติ กูลการขาย**, "วิธีการตรวจจับและการแก้ไขความขรุขระเชิงความร้อนในระบบการบันทึกเชิงแม่เหล็กแบบแนวตั้งโดยอาศัยเทคนิคการปรับเส้นโค้งที่เหมาะสม", เลขที่คำขอ 1001000394, 12 มีนาคม 2553.

2. ปิยะ โควินท์ทวีวัฒน์ และ **สันติ กูลการขาย**, "วิธีการตรวจจับและการแก้ไขความขรุขระเชิงความร้อนแบบวนซ้ำในระบบการบันทึกเชิงแม่เหล็กแบบแนวตั้ง", เลขที่คำขอ 1001000395, 12 มีนาคม 2553.

3. ปิยะ โควินท์ทวีวัฒน์ และ**สันติ กูลการขาย**, "วิธีการกำจัดความขรุขระเชิงความร้อนและอีควอไลเซชันในระบบการบันทึกเชิงแม่เหล็กแบบแนวตั้งแบบวนซ้ำ," เลขที่สิทธิบัตร 72604, 15 พฤศจิกายน 2562.

4. ปิยะ โควินท์ทวีวัฒน์, จาตุรงค์ ตันติบัณฑิต, และ **สันติ กูลการขาย** "วิธีการตรวจจับและแก้ไขความขรุขระเชิงความร้อนในระบบการบันทึกเชิงแม่เหล็กแบบแนวตั้งและระบบกู้ข้อมูลของฮาร์ดดิสก์ไดร์ฟที่ใช้วิธีการเช่นนั้น", เลขที่สิทธิบัตร 72470, 8 พฤศจิกายน 2562.

JOURNAL: (วารสาร)

2020

1. W. Busyatras, C. Warisarn, S. **Koonkarnkhai**, and P. Kovintavewat, "A simple 2D modulation code in single-reader two-track reading (SRTR) BPMR systems," Digital Communication and Network, **Accepted.**

2. S. **Koonkarnkhai** and P. Kovintavewat, "An iterative ITI cancellation method for multi-head multi-track bit-patterned magnetic recording systems," Digital Communication and Network, **Accepted.**

2019

3. S. **Koonkarnkhai**, C. Warisarn, and P. Kovintavewat, "An iterative 2-head 2-track detection method for staggered bit-patterned media recording systems," IEEE Transactions on Magnetics, vol. 55, no. 7, July 2019.

2018

4. **สันติ กูลการขาย** และคณะ "เทคนิคการตรวจหาและแก้ไขแบบวนซ้ำสำหรับข้อผิดพลาดจากการแทรกและการลบในระบบการบันทึกแบบบิตแพทเทิร์นมีเดีย" วารสารวิชาการเทคโนโลยีอุตสาหกรรม, ปีที่ 14, ฉบับที่ 1, ประจำเดือนมกราคม - เมษายน 2561, หน้า 1 - 12.

2017

5. C. Warisarn, W. Busyatras, L. M. M. Myint, S. **Koonkarnkhai** and P. Kovintavewat, "Mitigation of TMR using energy ratio and bit-flipping techniques in multi-head BPMR systems," IEEE Transactions on Magnetics, vol. 53, no. 11, Article number: 2600104, November 2017. (impact factor 1.243)

6. S. **Koonkarnkhai** and P. Kovintavewat, "Method to mitigate an insertion/deletion error in bit-patterned media recording systems," Journal of Thai Interdisciplinary Research (JTIR), vol. 12, no. 4, pp.51 - 56, July - August 2017.

2015

7. **S. Koonkarnkhai**, P. Kovintavewat, and P. Keeratiwintakorn, "Study of fractionally-spaced equalizers for bit-patterned media recording," IEEE Transactions on Magnetics, vol. 51, no. 11, Article number. 3001604, November, 2015.

8. P. Kovintavewat and **S. Koonkarnkhai**, "Simple unstable baseline detection methods for perpendicular magnetic recording," Maejo International Journal of Science and Technology (MIJS), vol. 9, no. 1, pp. 1 – 9, 2015. (Scimago Q3 and impact factor 0.329)

2014

9. P. Kovintavewat and **S. Koonkarnkhai**, "An improved TA suppression method for coded PR channels," Advanced Materials Research, vol. 979, pp. 46 – 49, 2014.

10. P. Kovintavewat and **S. Koonkarnkhai**, "Baseline popping detection and correction algorithms for perpendicular magnetic recording system," Advanced Materials Research, vol. 979, pp. 50 – 53, 2014.

11. **S. Koonkarnkhai**, P. Kovintavewat, and P. Keeratiwintakorn, "Trellis-based detecting the insertion and deletion bits for bit-patterned media recording," Advanced Materials Research, vol. 979, pp. 54 – 57, 2014.

2013

12. P. Kovintavewat, **S. Koonkarnkhai**, and A. Suvichakorn, "Head instability detection for testing process in perpendicular magnetic recording system," Advanced Materials Research (AMR), vol. 770, pp. 319 – 322, 2013.

13. **สันติ กูลการขาย**, ปิยะ โควินท์ทวีวัฒน์, "เทคนิคการใช้งานร่วมกันระหว่างรหัส Marker และรหัส RS สำหรับช่องสัญญาณการแทรก การลบ และการแทนที่," วารสารวิจัย มข., ปีที่ 18 ฉบับที่ 1 ประจำเดือน มกราคม – กุมภาพันธ์ 2556, หน้า 100 – 111.

2012

14. **S. Koonkarnkhai**, P. Keeratiwintakorn, N. Chirdchoo, and P. Kovintavewat "Target and equalizer design for high-density bit-patterned media recording," ECTI Transactions on Computer and Information Technology , vol. 6, no. 2, pp. 175 – 182, November 2012.

15. **S. Koonkarnkhai**, N. Chirdchoo and P. Kovintavewat, "Iterative decoding for high-density bit-patterned media recording," Procedia Engineering, vol.32, pp. 323 – 328, 2012.

2010

16. P. Kovitavewat and **S. Koonkarnkhai**, "A thermal asperity detection and correction algorithm for perpendicular magnetic recording channels" KMUTT Research and Development Journal, vol. 33, no. 3, pp. 197 – 206, July – September 2010.

17. P. Kovintavewat and **S. Koonkarnkhai**, "A method for TA suppression in perpendicular recording channels," Songklanakarin Journal Sci. Technology, vol. 32, no. 4, pp. 425 – 430, July – August 2010.

18. **สันติ กูลการขาย**, ปิยะ โควินท์ทวีวัฒน์ และพงษ์ศักดิ์ กีรติวินทกร, "การลดความซับซ้อนของอัลกอริทึมการตรวจหาและแก้ไขความขรุขระเชิงความร้อนในช่องสัญญาณการบันทึกเชิงแม่เหล็กแบบแนวตั้ง,"วารสารวิจัย มข., ปีที่ 15, ฉบับที่ 2, หน้า132-141, กุมภาพันธ์ 2553.

19. P. Kovintavewat and **S. Koonkarnkhai**, "Joint TA suppression and turbo equalization for coded partial response channels," IEEE Transaction on Magnetics, vol. 46, no.6, pp. 1393-1396, June 2010.

20. **S. Koonkarnkhai**, P. Kovintavewat, and P. Keeratiwintakorn, "Effect of bandpass filters for TA suppression in perpendicular recording system," ECTI Transactions on Electrical Engineering, Electronics, and Communications, vol. 8, no. 1, pp. 93-98, February 2010.

2009

21. P. Kovintavewat and **S. Koonkarnkhai**, "Thermal asperity suppression based on least squares fitting in perpendicular magnetic recording systems," Journal of Applied Physics, vol. 105, no.7, 07C114, March 2009.

2008

22. **สันติ กูลการขาย** และ ปิยะ โควินท์ทวีวัฒน์, "การเปรียบเทียบประสิทธิภาพของเทคนิคการปรับเส้นโค้งที่เหมาะสมสำหรับการระงับความขรุขระเชิงความร้อนในช่องสัญญาณการบันทึกแบบแนวตั้ง," วารสารวิชาการเนคเทค , ปีที่ 8, ฉบับที่ 20, เดือนกรกฎาคม – ตุลาคม 2551, หน้า 79 – 86.

CONFERENCE: (การประชุมวิชาการ)

2020

1. S. Sokjabok, C. Warisarn, **S. Koonkarnkhai**, and J. Lee, "Modified 2D Viterbi algorithm using 2D modulation encoding constraints in BPMR systems." In Proc. of 2020 17th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON), Phuket, Thailand, June 24 – 27, 2020.

2019

2. **S. Koonkarnkhai**, C. Warisarn, N. Chirdchoo, and P. Kovintavewat, "A soft ITI mitigation method for coded 2H2T BPMR systems," in Proc. of The 34-th ITCCSCC-2019, Jeju Shinhwa Wold, Korea, June 23-26, 2019.

3. S. Pomsanam, C. Warisarn, W. Busyatrus, L. M. M. Myint, **S. Koonkarnkhai**, and P. Kovintavewat, "Simple coding method with single-reader two-track reading (SRTR) in bit-patterned media recording (BPMR) systems," in Proc. of The 34-th ITCCSCC-2019, Jeju Shinhwa Wold, Korea, June 23-26, 2019.

4. W. Tipcharoen, C. Warisarn, L. M. M. Myint, **S. Koonkarnkhai**, and P. Kovintavewat, "Transition shift in head-assisted magnetic recording," in Proc. of The 34-th ITCCSCC-2019, Jeju Shinhwa Wold, Korea, June 23-26, 2019.

5. P. Kovintavewat, **S. Koonkarnkhai**, and C. Warisarn, "A simple 2-head 2-track detection method for staggered bit-patterned media recording," in Proc. of 2019 Joint MMM-Intermag Conference, Washington, DC, USA, January 14 - 18, 2019.

6. T. Chumpuwiset, C. Warisarn, L. M.M. Myint, **S. Koonkarnkhai** and P. Kovintavewat, "Modified 2D Viterbi algorithm using 2D modulation encoding constraint in bit-patterned magnetic recording," in Proc. of 2019 Joint MMM-Intermag Conference, Washington, DC, USA, January 14 - 18, 2019.

2018

7. **S. Koonkarnkhai**, and P. Kovintavewat, "A simple 2-head 2-track detection method for bit-patterned magnetic recording systems," in Proc. of the 18th International Symposium on Communications and Information Technologies (ISCIT 2018), Bangkok, Thailand, September 26 - 29, 2018, pp. 490 - 494.

8. T. Chumpuwiset, C. Warisarn, L. M. M. Myint, **S. Koonkarnkhai**, and P. Kovintavewat, "Complexity reduction of 2D detector using 2D modulation encoding constraint in multi-track multi-head BPMR systems," in Proc. of the 33rd International Technical Conference on Circuit/Systems, Computers and Communication (ITC-CSCC 2018), Bangkok, Thailand, July 4-7, 2018, pp. 536 - 538.

9. W. Busyatras, C. Warisarn, **S. Koonkarnkhai**, and P. Kovintavewat, "A track mis-registration estimation method based on a ratio value of readback signals in bit-patterned media recording systems ," in Proc. of the 33rd International Technical Conference on Circuit/Systems, Computers and Communication (ITC-CSCC 2018), Bangkok, Thailand, July 4-7, 2018, pp. 539 - 542.

2017

10. I. Nokyotin, **S. Koonkarnkhai**, W. Wongtrairat, T. Sopon, "Layered generalized belief propagation detection on BPMR system with multi-track processing," in Proc. of International Electrical Engineering Congress (iEECON) 2017, Pattaya, Thailand, March 8-10, 2017, pp. 1 - 4.

11. K. Buahing, W. Busyatras, C. Warisarn, **S. Koonkarnkhai** and P. Kovintavewat, "2D modulation code together with multi-track recording technique in staggered BPMR systems," in Proc. the 32nd International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2017), Busan, Korea, July 2-5, 2017.

12. C. Warisarn, W. Busyatras, L.M.M. Myint, **S. Koonkarnkhai,** and P. Kovintavewat "A TMR mitigation method with 3-track data detection for multi-track multi-head BPMR system," in Proc. of IEEE International Magnetics Conference 2017 (INTERMAG 2017) , DE-05, Dubling, Ireland, April 24-28, 2017.

2016

13. K. Buahing, W. Busyatras, C. Warisarn, **S. Koonkarnkhai,** and P. Kovintavewat "A performance improvement of a rate-5/6 2D modulation code in bit-patterned media recording systems," in Proc. of The 31-st International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2016), Okinawa, Japan, July 10-13, 2016.

2015

14. **S. Koonkarnkhai** and P. Kovintavewat, "Study of fractionally-spaced equalizers for bit-patterned media recording," in Proc. of IEEE International Magnetics Conference 2015 (INTERMAG 2015), HQ-13, Beijing, China, May 11-15, 2015.

2014

15. **S. Koonkarnkhai**, P. Kovintavewat, and P. Keeratiwintakorn, "A simple method to detect and correct an insertion/deletion error for bit-patterned media recording," in Proc. of the 29th International Technical

Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2014), July 1-4, 2014, Phuket, Thailand.

2013

16. P. Kovintavewat and **S. Koonkarnkhai**, "An improved iterative TA suppression method for coded perpendicular magnetic recording channels," in Proc. of the 5th International Science, Social Science, Engineering and Energy Conference (ISEEC) 2013, December 18-20, 2013, Kanchanaburi, Thailand.

17. P. Kovintavewat and **S. Koonkarnkhai**, "A baseline popping detection and correction algorithm for perpendicular magnetic recording system," in Proc. of the 5th International Science, Social Science, Engineering and Energy Conference (ISEEC) 2013, December 18-20, 2013, Kanchanaburi, Thailand.

18. **S. Koonkarnkhai**, P. Kovintavewat, and P. Keeratiwintakorn, "Trellis-based detecting insertion and deletion of bits for bit-patterned media recording," in Proc. of the 5th International Science, Social Science, Engineering and Energy Conference (ISEEC) 2013, December 18-20, 2013, Kanchanaburi, Thailand.

19. **S. Koonkarnkhai**, P. Kovintavewat, and P. Keeratiwintakorn, "Iterative decoding with insertion and deletion errors for bit-patterned media recording channels," in Proc. of the 28th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2013), Yeosu, Korea, June 30 – July 3, 2013.

20. **S. Koonkarnkhai** et al. "A simple Baseline popping detection and correction for perpendicular magnetic recording channels," in Proc. of the 28th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC 2013), Yeosu, Korea, June 30 – July 3, 2013.

21. P. Kovintavewat, **S. Koonkarnkhai**, and A. Suvichakorn, "Head instability detection for testing process in perpendicular magnetic recording system," in Proc. of The International conference on Applied Physics and Material Applications (ICAPMA2013), Petchaburi, Thailand, Feb 20-22, 2013.

22. **S. Koonkarnkhai**, C. Warisarn, and P. Kovintavewat, "Iterative decoding for bit-patterned media recording in insertion/deletion errors," in Proc. of the 4th International Science Social-Science Conference (ISEEC) 2012, Cha-Am, Petchburi, Thailand, December 11 – 14, 2012,

2011

23. **S. Koonkarnkhai**, N. Chirdchoo and P. Kovintavewat, "Iterative decoding for high-density bit-patterned media recording," in Proc. of the 3-rd International Science Social-Science Conference 2011, Nakhon Pathom, Thailand, December 15-18, 2011.

24. **S. Koonkarnkhai**, P. Keeratiwintakorn, N. Chirdchoo, and P. Kovintavewat, "Two-dimensional cross-track asymmetric target for high-density bit-patterned media recording," in Proc. of the 19th International Symposium on Intelligent Signal Processing and Communication Systems 2011, Chiangmai, Thailand, December 7-9, 2011.

2010

25. ธีระชาติ ทองคำ, **สันติ กูลการขาย**, ปิยะ โควินท์ทวีวัฒน์, และ พรชัย ทรัพย์นิธิ "ประสิทธิภาพของการทำงานร่วมกันระหว่างการกำจัดความขรุขระเชิงความร้อนและอีควอไลเซชันแบบเทอร์โบในช่องสัญญาณการบันทึกเชิงแม่เหล็กแบบแนวตั้ง," การประชุมวิชาการทางวิศวกรรมไฟฟ้า ครั้งที่ 33, เชียงใหม่, 1-3 ธันวาคม 2553, CM 045, หน้า 1025 – 1028.

26. S. Koonkarnkhai, C. Tuntibundhit, and P. Kovintavewat, "A TA suppression method based on wavelet packet for perpendicular recording channels," in Proc. of the 25th International Technical Conference on Circuit/System, Computers and Communications (ITC-CSCC) 2010, Pattaya, Thailand, July 4-7, 2010.

27. T. Thongkam, S. Koonkarnkhai, P. Kovintavewat, and P. Supnithi, "Investigation of iterative TA suppression method in perpendicular recording system," in Proc. of the 3rd Data Storage Technology Conference 2010, BITEC, Bangkok, Thailand, July 30 - August 1, 2010.

28. P. Kovintavewat and S.Koonkarnkhai, "Joint TA suppression and turbo equalization for coded partial response channels," in Proc. of the 11th Joint Magnetism and Magnetic Materials - INTERMAG Conference, Washington, DC, USA, GH-03, January 18-22, 2010.

2009

29. P. Kovintavewat, C. Tuntibundhit, S. Koonkarnkhai, et al., "A TA suppression method based on wavelet transform for perpendicular recording channels," in Proc. of the 24th International Technical Conference on Circuit/System, Computers and Communications (ITC-CSCC) 2009, Jeju Island, Korea, pp. 1511 - 1514, July 5-8, 2009.

30. P. Kovintavewat and S. Koonkarnkhai, "A new thermal asperity detection and correction algorithm for perpendicular recording channels," in Proc. of the Data Storage Technology Conference 2009, DST-117, Thailand Science Park Convention Center, Bangkok, Thailand, May 13-15,2009. (**The best paper award**)

31. S. Koonkarnkhai, P. Kovintavewat, and P. Keeratiwintakorn, "The effect of bandpass filters for thermal asperity suppression in perpendicular recording systems," in Proc. of the 6th ECTI-CON 2009, Pattaya, Thailand, vol. 2, pp.1022-1025 May 6-9, 2009.

32. P. Kovintavewat, S. Koonkarnkhai, et al., "A novel thermal asperity suppression for perpendicular recording channels," in Proc. of IEEE International Conference on Magnetics (INTERMAG 2009), Sacramento, California, USA, BP-06, May 4-8, 2009.

2008

33. P. Kovintavewat and S. Koonkarnkhai, "Thermal asperity suppression based on least squares fitting in perpendicular magnetic recording systems," in Proc. of the 53rd Annual Conference on Magnetism and Magnetic Materials, Austin, Texas, USA, pp. 211 – 212, November 10 -14, 2008.

34. **สันติ กูลการขาย** และ ปิยะ โควินท์ทวีวัฒน์, "การระงับความขรุขระเชิงความร้อนแบบที่ถูกปรับปรุงในช่องสัญญาณการบันทึกแบบแนวตั้ง," การประชุมวิชาการทางวิศวกรรมไฟฟ้า ครั้งที่ 31, นครนายก, ฉบับที่ 2, 29 – 31 ตุลาคม 2551, CM-05, หน้า 665 – 668.

Book

- S. Koonkarnkhai, C. Warisarn, and P. Kovintavewat, Signal Processing for Digital Data Storage: Volume IV: Advanced Receiver for BPMR and TDMR, 2017. (Thai)

Research Interests

- Thermal asperity (TA) detection and correction for magnetic recording system
- Target and equalizer design for magnetic recording system
- Insertion/deletion and substitution correcting codes
- Coding and equalization turbo code for magnetic recording system
- Multi-head multi-track detection
- New technologies of magnetic recording systems

Relevant Courses

- Digital Communication
- Principle Communication
- Digital Signal Processing for Hard Disk Drive
- Advanced Digital Signal Processing

Professional Member

Council of Engineer (COE), Thailand

License for Professional Practice

Associate Electrical Engineer (Telecommunication/Electronic)

Research Fund

May, 2019 – Apr 2020: Project Leader; A multi-head multi-track detection method for bit-patterned media recording systems, [Funding Source: Research and Development Institute, NPRU]

Jan, 2017 – Dec, 2018: Project Leader; Development of two-track detection method for bit-patterned media recording systems, [Funding Source: Research and Development Institute, NPRU]

Oct, 2014 – Sep, 2015: Project Leader; Target and equalizer design for ultra-high density staggered bit-patterned magnetic recording channels, [Funding Source: Research and Development Institute, NPRU]

Oct, 2012 – Sep, 2013: Co-Researcher; A novel write synchronization technique for bit-patterned magnetic recording system, [Funding Source: Research and Development Institute, NPRU]

May, 2012 – May, 2013: Co-Researcher; Development of Iterative Thermal Asperity Detection and Correction Algorithm, [Funding Source: College of Data Storage Technology and Applications, KKU]

Oct, 2007 – May, 2009: Co-Researcher; Development of Thermal Asperity Detection and Correction Algorithm, [Funding Source: Data Storage Technology and Application Research Center (D*STAR), King Mongkut's

Institute of Technology Ladkrabang, and National Electronics and Computer Technology Center (NECTEC), Thailand]

Reference   Upon requested.