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九州大学
KYUSHU UNIVERSITY

SNU-KYUSHU JOINT SYMPOSIUM

GROW MORE RESILIENT :
HOW UNIVERSITY INVENTIONS ARE CONTRIBUTING TO UNPRECEDENTED GLOBAL CRISES

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SNU-KYUSHU JOINT SYMPOSIUM

GROW MORE RESILIENT : HOW UNIVERSITY INVENTIONS ARE CONTRIBUTING TO UNPRECEDENTED GLOBAL CRISES

Hosted by Kyushu University
9 September 2020 (online)

■ BACKGROUND

When QS-APPLE 2019 took place in Fukuoka in November 2019, the senior executives from SNU and Kyushu had a chance to discuss further collaborations in person. Both parties have identified each other as a high priority partner, and have agreed to work on deepening the links, for example, through organizing an annual joint symposium.

■ PURPOSE OF THE SYMPOSIUM

The joint symposium is designed to develop existing and new research collaborations between the two universities while facilitating greater mutual understanding among SNU-Kyushu academics, with seed funding available. Simultaneously, it is highly encouraged to explore opportunities for education activities, such as increased mobility of doctoral students.

■ PROGRAM

Wednesday, September 9 (Via Zoom YouTube Live Streaming)

Plenary Session (MC: Associate Professor Hiroko KINOSHITA, Kyushu)

09:30	Opening Remarks Welcome Remarks by President Chiharu KUBO, Kyushu Congratulatory Remarks by President Se-Jung OH, SNU
09:45	Keynote Speech (1) Professor Toshiharu NINOMIYA, Kyushu
10:15	Keynote Speech (2) Professor Chan-Soo SHIN, SNU
10:45	Break
11:00	Introduction of Satellite Sessions (up to 10mins per session)
11:30	Closing

Parallel Sessions

13:00-17:00	Medicine
14:00-17:40	Spatial and Environmental Economics
13:00-16:40	Materials Chemistry and Engineering

Kyushu University



Chiharu KUBO

President
Kyushu University

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Research Expertise

- Psychosomatic Medicine (Psycho-neuro-endocrino-immunology)
- Allergology

Academic Background

- Ph.D., Department of Psychosomatic Medicine, Faculty of Medicine, Kyushu University, (1981)
- M.D., Department of Psychosomatic Medicine, Faculty of Medicine, Kyushu University, (1973)

Professional Appointments

President, Kyushu University (2014-present),
Director of Kyushu University Hospital (2008-2014),
Professor, Head of Department of Psychosomatic Medicine, Faculty of Medicine, Kyushu University (1993-2008);
President of International College of Psychosomatic Medicine (2011-2013),
President of Asian College of Psychosomatic Medicine (2011-present)

Selected Publications

1. Chiharu Kubo, B. Connor Johnson, Noorbibi K. Day, Robert A. Good, Calorie source, calorie restriction, immunity and aging of (NZB/NZW) F1 mice., *Journal of Nutrition*, 114: 1884-1899, 1984
2. Chiharu Kubo, Noorbibi K. Day, Robert A. Good, Influence of early or late dietary restriction on life span and immunological parameters in MRL/Mp-lpr/lpr mice., *Proc. Natl. Acad. Sci. USA.*, 81: 5831-5835, 1984
3. Nobuyuki Sudo, Yoichi Chida, Junko Sonoda, Naomi Oyama, Xiao-Nian Yu, Chiharu Kubo, Yasuhiro Koga, Postnatal microbial colonization programs the hypothalamic-pituitary-adrenal system for stress response in mice., *J. Physiological*, 558(1): 263-275, 2004

Seoul National University



Se-Jung OH

President

Seoul National University

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URL: <https://snu.ac.kr>

Research Expertise

Experimental condensed matter physics using synchrotron radiation.

Academic Background

1982 Ph.D. in Physics, Stanford University
1975 B.S. in Physics, Seoul National University

Professional Appointments

2019 - Present President, Seoul National University
2000 - Present Member, Korean Academy of Science and Technology
2016 - 2018 Member, Science, ICT, Broadcasting and Communication Committee, the 20th National Assembly, Republic of Korea
2011 - 2014 Vice President, Korean Federation of Science and Technology Societies
2011 - 2014 President, Institute for Basic Science
2011 President, National Research Foundation of Korea
2008 - 2009 Member, the 1st Presidential Advisory Commission on National Science Education
2004 - 2008 Dean, College of Natural Sciences, Seoul National University
2004 - 2008 Chair, Natural Sciences Deans Summit
2004 - 2006 Member, the 8th and 9th Presidential Advisory Commission on National Science Education
2003 Member, Presidential Committee on Future Environment Policy
1999 - 2014 Director, Center for Strongly Correlated Materials Research
1999 - 2001 Member, the 5th Presidential Advisory Commission on National Science Education
1989 - 1994 Member, Presidential Advisory Commission on the 21st Century Science and Technology
1984 - 2016 Assistant, Associate, and Full Professor in Physics, Seoul National University
1981 - 1984 Research Fellow, Xerox Palo Alto Research Center

Selected Publications

Academic Papers

Published 181 academic papers in total (163 in international and 18 in Korean journals)

Awards and Honors

2003 Scientist to be Emulated, Ministry of Science and Technology of Republic of Korea
1998 Korean Science Award, National Research Foundation of Korea

Keynote Speech 1



Toshiharu NINOMIYA

Professor, Department of Epidemiology and Public Health,
Kyushu University

Contact Email: nino@eph.med.kyushu-u.ac.jp
URL: <http://www.eph.med.kyushu-u.ac.jp/>

Research Expertise

1. Epidemiological and clinical research for the development cardiovascular and kidney disease
2. Epidemiological research for the development of dementia
3. Meta-analysis of the risk factors for cardiovascular disease, kidney disease, and dementia

Academic Background

- 1993 M.D. Faculty of Medicine, Kyushu University, Japan
2000 Ph.D. (Dr. of Medical Science) Faculty of Medicine, Kyushu University, Japan

Professional Appointments

- 2003-2006: Research Fellow, Department of Epidemiology and Public Health, Graduate School of Medical Sciences, Kyushu University, Japan
2006-2009: Visiting Research Fellow, Renal & Metabolic Division, George Institute for Global Health, Australia
2009-2013: Clinical Fellow (2009-2011) and Assistant Professor (2011-2013), Department of Nephrology, Hypertension and Stroke, Kyushu University Hospital, Japan
2013-2014: Senior Research Fellow, Renal & Metabolic Division, George Institute for Global Health, Australia
2014-2016: Professor, Center for Cohort Studies, Graduate School of Medical Sciences, Kyushu University, Japan,
2016-present: Professor, Department of Epidemiology and Public Health, Graduate School of Medical Sciences, Kyushu University, Japan

Selected Publications

1. Ninomiya T, Kiyohara K, et al. Impact of kidney disease and blood pressure on the development of cardiovascular disease: an overview from the Japan Arteriosclerosis Longitudinal Study. *Circulation* 118: 2694-2701, 2008
2. Ninomiya T, Ohara T, et al. Midlife and late-life blood pressure and dementia in Japanese elderly: the Hisayama Study. *Hypertension* 58: 22-28, 2011
3. Ninomiya T, Perkovic V, et al. Blood pressure lowering and major cardiovascular events in people with and without chronic kidney disease: meta-analysis of randomised controlled trials. *BMJ* 347: f5680, 2013
4. Liyanage T, Ninomiya T (Double first author), et al. Worldwide access to treatment for end-stage kidney disease: a systematic review. *Lancet* 385: 1975-1982, 2015.

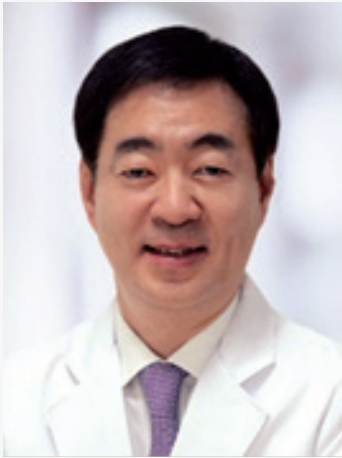
Community-based prospective cohort study for dementia: the Hisayama Study

Toshiharu NINOMIYA

Abstract

The Hisayama Study is a community-based prospective cohort study designed to evaluate the risk factors for lifestyle-related diseases-including stroke, coronary heart disease, hypertension, diabetes, and dementia. The prospective follow-up surveys have been conducted in subjects aged 40 or older since 1961. The remarkable characteristics of this study include its high participation rate (70–80% of all residents aged 40 or older), high follow-up rate (99% or over), and high autopsy rate (approximately 75% of deceased cases). The Hisayama Study has provided valuable evidence of secular change in the prevalence and incidence of several lifestyle-related disease and their risk factors. The study has thereby contributed to elucidation of the preventive strategies for lifestyle-related disease. Research efforts in this cohort are ongoing and will provide additional data for the improvement of human health and longevity. In my talk, I will present the recent findings of dementia research from the Hisayama Study.

Keynote Speech 2



Chan Soo SHIN

Dean, College of Medicine, Seoul National University

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SNS:

Research Expertise

Specialty: Osteoporosis, Parathyroid gland, Pituitary disease, Adrenal disease, Diabetes, Obesity

Academic Background

- 1987 M.D. Seoul National University Graduate School, Seoul, Korea
- 1990 M.S. Seoul National University Graduate School, Seoul, Korea
- 1998 Ph.D. Seoul National University Graduate School, Seoul, Korea

Professional Appointments

- 1995-1997 Instructor in Internal Medicine, Seoul National University College of Medicine, Seoul, Korea
- 1998-2003 Assistant Professor in Internal Medicine, Seoul National University College of Medicine, Seoul, Korea
- 2003-2008 Associate Professor in Internal Medicine Seoul National University College of Medicine, Seoul, Korea
- 2008- Professor in Internal Medicine, Seoul National University College of Medicine, Seoul, Korea

Selected Publications

1. Zheng T, Kang JH, Sim JS, Kim JW, Koh JT, Shin CS, Lim H, Yim M 2017 The farnesoid X receptor negatively regulates osteoclastogenesis in bone remodeling and pathological bone loss. *Oncotarget* 8(44): 76558-73.
2. Lee JH, Kim JH, Hong AR, Kim SW, Shin CS 2017a Skeletal effects of vitamin D deficiency among patients with primary hyperparathyroidism. *Osteoporos Int* 28(5): 1667-74.
3. Lee JE, Kim KM, Kim LK, Kim KY, Oh TJ, Moon JH, Choi SH, Lim S, Kim SW, Shin CS, Jang HC 2017c Comparisons of TBS and lumbar spine BMD in the associations with vertebral fractures according to the T-scores: A cross-sectional observation. *Bone* 105(269-75).
4. Kong SH, Kim JH, Hong AR, Lee JH, Kim SW, Shin CS 2017a Dietary potassium intake is beneficial to bone health in a low calcium intake population: The Korean National Health and Nutrition Examination Survey (KNHANES) (2008-2011). *Osteoporos Int* 28(5): 1577-85.
5. Kong SH, Kim JH, Hong AR, Cho NH, Shin CS 2017b Dietary calcium intake and risk of cardiovascular disease, stroke, and fracture in a population with low calcium intake. *Am J Clin Nutr* 106(1): 27-34.
6. Kim YW, Kim JH, Yoon SH, Lee JH, Lee CH, Shin CS, Park YS 2017a Vertebral bone attenuation on low-dose chest CT: quantitative volumetric analysis for bone fragility assessment. *Osteoporos Int* 28(1): 329-38.
7. Kim JH, Hong AR, Choi HJ, Ku EJ, Cho NH, Shin CS 2017b Sex-based Differences in the Association between Body Composition and Incident Fracture Risk in Koreans. *Sci Rep* 7(1): 5975

Crisis as an Opportunity: Innovation for COVID-19

Chan Soo SHIN

Abstract

COVID-19 epidemic now hits all continents resulting in 0.7 million deaths as of July 2020. This unprecedented situation affects not only healthcare and international travel but other areas such as education, environment and cultural norms.

In response to growing patients in Korea, Seoul National University College of Medicine (SNUCM) initiated COVID-19 Science Committee to provide scientific information on COVID-19 to the public and academic societies. Expert opinion on diagnosis, treatment and epidemiology from the faculty members of SNUCM as well as COVID-19 statistics are regularly updated on the committee website. The committee organizes a webinar series on the national and academic level responses to the pandemic with domestic and international delegates.


Also, an investigation is going on, especially in the field of diagnostic tests and antibody treatments. SARS-CoV-2 can be detected through various methods such as molecular diagnostic tests, serological diagnostic tests, and antigen diagnostic tests. Neutralizing antibody treatment against SARS-CoV-2 is developing.

Seoul National University Hospital also operated a so-called "Community COVID-19 management center" in a hospital-owned hostel, which is normally used for employee training, located about 200km away. The center is open to mild cases with COVID-19 positive who need to be observed. In that center SNUH deployed a number of tele-medicine systems it has developed. 1) Cloud-based tele-imaging system that enables interpretation of the CT scans and X-rays remotely at the main hospital; 2) Smart vital sign monitoring devices that can transfer blood pressure, ECG, respiratory rate and oxygen saturation to the medical staffs both at the center and remotely to the main hospital; 3) Mobile history taking apps etc. Indeed, the center is working as a testbed for these recently-developed equipment or devices.

With the outbreak of COVID-19 and the necessity of social distancing, we are getting closer to the digitalized and connected society with tele-medicine and tele-work much sooner than planned and it would be important to take advantage of this crisis as a chance to transform our infrastructure.



Satellite Sessions



Session 1 :
Medicine

SNU – KYUSHU JOINT SYMPOSIUM Satellite Session

● **Session Theme** : Medicine-1: Case discussion on gastroenterology

● **Date & Time** : 13:00-14:00, September 9, 2020

● **Organized by** : (SNU)

Prof. Jin-Hyeok HWANG

(Kyushu)

Dr. Tomohiko MORIYAMA

● **Time Schedule**

Time	Specific Schedule	Speaker
13:00-13:05	Opening remarks	Tomohiko MORIYAMA
13:05-13:30	Presentation from KU	Yuichi MATSUNO
13:30-13:55	Presentation from SNU	Jin-Hyeok HWANG
13:55-14:00	Closing remarks	Jin-Hyeok HWANG

Medicine-1: Case discussion on gastroenterology



Tomohiko MORIYAMA, MD, PhD

Associate Professor, International Medical Department,
Kyushu University Hospital

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Research Expertise

Diagnosis and treatment of early gastrointestinal cancer
Diagnosis and treatment of inflammatory bowel disease

Academic Background

1990-1996 Faculty of Medicine, Kyushu University (Awarded the degree of MD)
2001-2003 Research fellow of Kyushu University (Awarded the degree of PhD)

Professional Appointments

1996-1997 Kyushu University Hospital (Residency)
1997-1998 Saiseikai Yawata Hospital (Residency)
1998-2001 Matsuyama Red Cross Hospital (Fellowship)
2003-2005 Kyushu University Hospital (Staff)
2005-2007 Kimura Hospital (Staff)
2007-2018 Assistant professor, Department of Medicine and Clinical Science, Kyushu University
2018- Associate professor, International Medical Department, Kyushu University Hospital
Board Certified Member of the Japanese Society of Internal Medicine
Councilor and Board Certified Trainer of the Japanese Society of Gastroenterology
Councilor and Board Certified Trainer of Japan Gastroenterological Endoscopy Society
Board Certified Trainer of the Japanese Gastroenterological Association

Selected Publications

1. Moriyama T, Uraoka T, Esaki M, Matsumoto T. Advanced technology for the improvement of adenoma and polyp detection during colonoscopy. Dig Endosc 2015; 27 Suppl 1: 40-4.
2. Hirano A, Umeno J, Moriyama T, et al. Comparison of the microbial community structure between inflamed and non-inflamed sites in patients with ulcerative colitis. J Gastroenterol Hepatol 33: 1590-1597, 2018
3. Moriyama T, Kudo K, Ueda S, et al. Remote education of early gastric cancer in Central Asia and Russia. News of the Academy of Sciences of the Republic of Tajikistan 2019; 257: 105-11.

Medicine-1: Case discussion on gastroenterology



Yuichi MATSUNO, MD, PhD

Assistant Professor, Department of Medicine and Clinical Science,
Kyushu University

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Research Expertise

Diagnosis and treatment of inflammatory bowel disease

Diagnosis and treatment of early gastrointestinal cancer

Academic Background

2003-2009 Faculty of Medicine, Kyushu University (Awarded the degree of MD)

2016-2020 Postgraduate course of Kyushu University (Awarded the degree of PhD)

Professional Appointments

2009-2011 Steel Memorial Yawata Hospital (Residency)

2011-2012 Kyushu University Hospital (Fellowship)

2012-2013 Fukuoka Red Cross Hospital (Fellowship)

2013-2014 Shimonoseki City Hospital (Fellowship)

2014-2015 Hamanomachi Hospital (Fellowship)

2015-2016 Kyushu Central Hospital (Fellowship)

2020- Assistant professor, Department of Medicine and Clinical Science, Kyushu University

Board Certified Member of the Japanese Society of Internal Medicine

Board Certified Gastroenterologist of the Japanese Society of Gastroenterology

Board Certified Fellow of Japan Gastroenterological Endoscopy Society

Board Certified Fellow of the Japanese Society for Helicobacter Research

Selected Publications

1. [Matsuno Y](#), Hirano A, Esaki M. Possible association of phlebitis-induced colitis with indigo naturalis. *Gastroenterology* 2018; 155: 576-7.
2. [Matsuno Y](#), Umeno J, Esaki M, et al. Measurement of prostaglandin metabolism is useful in diagnosis of small bowel ulcerations. *World J Gastroenterol* 2019; 25: 1753-63.
3. Naganuma M, Sugimoto S, [Matsuno Y](#), et al. Adverse events in patients with ulcerative colitis treated with indigo naturalis: a Japanese nationwide survey. *J Gastroenterol* 2019; 54: 891-6.
4. [Matsuno Y](#), Hirano A, Torisu T, et al. Short-term and Long-term outcomes of indigo naturalis treatment for inflammatory bowel disease. *J Gastroenterol Hepatol* 2020; 35: 412-7.

Short-term and long-term outcomes of indigo naturalis treatment for inflammatory bowel disease

Yuichi MATSUNO

Abstract

Indigo naturalis (IN) is a traditional Chinese herbal medicine reported to be effective in inducing remission in ulcerative colitis (UC). We investigated the efficacy and safety of IN for induction and maintenance therapy in patients with inflammatory bowel disease. Data were collected from the electric medical records of patients with inflammatory bowel disease who had started IN treatment at Kyushu University Hospital. Clinical response, remission rates, cumulative IN continuation rates, and overall adverse events (AEs) were analyzed. Seventeen UC patients and eight CD patients were enrolled. Clinical response and remission rates at week 8 were 94.1% and 88.2% in UC patients and 37.5% and 25.0% in CD patients, respectively. Clinical remission rates, as assessed through non-responders imputation analyses at weeks 52 and 104, were 76.4% and 70.4% in UC patients and 25.0% and 25.0% in CD patients, respectively. Ten patients (40%) experienced AEs during follow-up. Three patients (12%) experienced severe AEs, including acute colitis requiring hospitalization in two patients and acute colitis with intussusception requiring surgery in one patient. IN showed favorable therapeutic efficacy in UC, whereas its therapeutic efficacy in CD appeared to be modest. The risk of severe AEs should be recognized for IN treatment.

Medicine-1: Case discussion on gastroenterology



Jin-Hyeok HWANG

Professor, Internal Medicine,
Seoul National University College of Medicine

Contact Email: woltoong@snu.ac.kr

Research Expertise

Circulating tumor cluster/chip, 3D-culture system, precision medicine/early diagnosis of cancers using liquid biopsy, sarcopenia/cachexia, pancreatic cancer genetic evolution, gene-therapy (clinical trial), predictive biomarker, pancreatic cancer tumorigenesis/chromosomal instability: Pancreatic cancer, cholangiocarcinoma and gallbladder cancer

Academic Background

2003-2005 Ph.D., in Internal Medicine, Seoul National University, Seoul, Korea

Professional Appointments

2014-present Professor, Department of Internal Medicine
Seoul National University College of Medicine/Seoul National University Bundang Hospital
2014-present Director, Health Promotion Center, Seoul National University Bundang Hospital

Selected Publications (Recent published articles as a correspondence)

- High PD-L1 expression is associated with therapeutic response to pembrolizumab in patients with advanced biliary tract cancer. *Sci Rep.* 2020
- Higher Tumor Cellularity in Resected Pancreatic Ductal Adenocarcinoma Is a Negative Prognostic Indicator. *Gut Liver.* 2020
- Comparison of FOLFIRINOX and Gemcitabine Plus Nab-paclitaxel for Treatment of Metastatic Pancreatic Cancer: Using Korean Pancreatic Cancer (K-PaC) Registry. *Am J Clin Oncol.* 2020
- Gemcitabine Plus Cisplatin Chemotherapy Prolongs the Survival in Advanced Hilar Cholangiocarcinoma: A Large Multicenter Study. *Am J Clin Oncol.* 2020
- Tolerability and safety of EUS-injected adenovirus-mediated double-suicide gene therapy with chemotherapy in locally advanced pancreatic cancer: a phase 1 trial. *Gastrointest Endosc.* 2020
- Non-SMC condensin I complex subunit H mediates mature chromosome condensation and DNA damage in PC cells. *Sci Rep.* 2019
- Validation of the American Joint Committee on Cancer 8th edition staging system for the PDAC. *Eur J Surg Oncol.* 2019
- Neoadjuvant therapy versus upfront surgery in resectable pancreatic cancer according to intention-to-treat and per-protocol analysis: A systematic review and meta-analysis. *Sci Rep.* 2019
- Optimal dose reduction of FOLFIRINOX for preserving tumour response in advanced pancreatic cancer: Using cumulative relative dose intensity. *Eur J Cancer.* 2017

immunotherapy in biliary tract cancers

Jin-Hyeok HWANG

Abstract

Biliary tract cancers (BTC) show dismal clinical outcomes with 5-year survival rates of 20–30%, even though significant progress has been made in diagnosis and treatment. Gemcitabine-cisplatin combination is the standard first-line treatment for BTC with no standard second-line therapy. Since immune checkpoint inhibitors (ICI) have demonstrated long-lasting anti-tumoral effects and were now approved for standard treatment in several solid cancers including lung cancer, their indications are expanded quickly so far.

PD-L1 expression has been reported in 9.1-72.2% patients with biliary tract cancer thus, anti-ICIs can be a promising treatment modality in certain patients with biliary tract cancers. However, biomarkers in predict tumor response in ICIs are still absent in BTC. Nevertheless, interim results of an ongoing trial (KEY-NOTE-028, NCT02054806) showed promising outcomes of pembrolizumab (anti-PD-1 antibody) in patients with PD-L1-positive advanced BTC.

Here are cases of advanced BTC who treated with pembrolizumab.

SNU – KYUSHU JOINT SYMPOSIUM Satellite Session

- **Session Theme** : Medicine-2: Surgery
- **Date & Time** : 14:30-15:30, September 9
- **Organized by** : (SNU)
 Ho-Seong HAN, MD, PhD
 (Kyushu)
 Shuji SHIMIZU, MD, PhD
 Masafumi NAKAMURA, MD, PhD

● **Time Schedule**

Time	Specific Schedule	Speaker
14:30-14:35	Greetings	Shuji SHIMIZU
14:35-15:00	Presentation from Fukuoka	Kohei NAKATA, Masafumi NAKAMURA
15:00-15:25	Presentation from Seoul	Ho-Seong HAN
15:25-15:30	Greetings	Ho-Seong HAN

Medicine-2: Surgery



Shuji SHIMIZU

Chairman and Professor, International Medical Department,
Kyushu University Hospital

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URL: <http://www.imed.med.kyushu-u.ac.jp/en/index.html>
SNS: <https://www.facebook.com/ovex.temdec>

Research Expertise

General Surgery, Telemedicine,

Academic Background

1975-1980 M.D., Medicine, Kyushu University, Fukuoka, Japan
1981-1986 Ph.D., Medicine, Kyushu University, Fukuoka, Japan

Professional Appointments

1995-1998 Assistant Professor, Department of Surgery I, Kyushu University Hospital, Fukuoka, Japan
1999-2015 Associate Professor, Department of Endoscopic Diagnostics and Therapeutics,
2012- Director, Telemedicine Development Center of Asia
2016- Chairman and Professor, International Medical Department
2016- Director, Overseas Exchange Center
2018 President, The 22nd Congress of Japanese Telemedicine and Telecare Association
2019 President, The 4th Annual Meeting of International Society of Clinical Medicine

Selected Publications

1. Shimizu S, Kudo K, Moriyama T, et al. Telemedical education in Asia. In: Ray PK NN, et al., editors. Mobile Technologies for Delivering Healthcare in Remote, Rural or Developing Regions. e-Health Technologies. London, UK: The Institution of Engineering and Technology; 2020. p.179-88
2. Shimizu S, Kudo K, Tomimatsu S, et al. International telemedicine activities in Thailand. Siriraj Med J. 70(5):471-5, 2018
3. Shimizu S, Han HS, Kudo K, et al. Telemedicine: Principles and the Future. In: Mishra PK (eds): Textbook of Surgical Gastroenterology. Jaypee Brothers Medical Publishers Ltd. New Delhi. 1352-1356, 2016
4. Shimizu S, Kudo K, Antoku Y, et al.: Ten-year experience of remote medical education in Asia. Telemedicine and eHealth 20(11):1021-1026, 2014
5. Shimizu S, Han HS, Okamura K, Nakashima N, Kitamura Y, Tanaka M. Technologic developments in telemedicine: state-of-the-art academic interactions. Surgery. 147(5):597-601, 2010

Medicine-2: Surgery



Ho-Seong HAN

Professor, Surgery, Seoul National University, College of Medicine

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Research Expertise

Hepatobiliary surgery, Minimal invasive surgery, and Telemedicine

Academic Background

1978-1984 M.D., Seoul National University College of Medicine

1986-1988 M.S., Seoul National University College of Medicine

1989-1993 Ph.D., Seoul National University College of Medicine

Professional Appointments

- 2003- Present. Professor of Department of Surgery
Seoul National University College of Medicine
Seoul National University Bundang Hospital(SNUBH)
- 2012- 2016 Director of Comprehensive Cancer Center of SNUBH
- 2013- 2016 Vice President of SNUBH.
- 2019- Present Director of Korean Armed Forces Capital Hospital

Selected Publications

- Three-Dimensional Laparoscopic Anatomical Segment 8 Liver Resection with Glissonian Approach. Jang JY, Han HS, Yoon YS, Cho JY, Choi Y, Lee W, Shin HK, Choi HL. Ann Surg Oncol. 2017 Jun;24(6):1606-1609
- Total laparoscopic living donor right hepatectomy. Han HS, Cho JY, Yoon YS, Hwang DW, Kim YK, ShinHK, Lee W.Surg Endosc. 2015 Jan;29(1):184.
- Laparoscopic versus open liver resection for hepatocellular carcinoma: Case - matched study with propensity score matching. Han HS, Shehta A, Ahn S, Yoon YS, Cho JY, Choi Y. J Hepatol. 2015 Sep;63(3):643-50.
- Is Laparoscopy Contraindicated for Gallbladder Cancer? A 10-Year Prospective Cohort Study. Yoon YS, Han HS, Cho JY, Choi Y, Lee W, Jang JY, Choi H. J Am Coll Surg. 2015 Oct;221(4):847-53.

Telemedicine in Surgery

Ho-Seong HAN

Abstract

Telemedicine has several advantages over conventional meetings.

First, the people don't have to travel to meet the people. Second, this is cost effective, because it saves money for travel and stay. Lastly, it save time because travelling needs a several days usually. During these Corona pandemic, telemedicine is effective ways for sharing knowledge and expertise.

In surgery, telemedicine plays a beneficial role. Recently, laparoscopic surgery has become main treatment method for various diseases. Laparoscopic surgery uses optic image for the screen for operation. This optic image can be transferred to remote site with use of telemedicine. Then, the people in the remote area can see the operation as they are in the operation room. They can observe the operation without travelling. If the surgeon cannot afford travel due to economic reason or social problems, this activity is useful to see the advanced surgery in Korea. Especially, young surgeon from many countries would like to learn operation technique performed in Korea. Telemedical surgery, live or recorded has been a good way to learn new and innovative operation techniques. After the Corona pandemic is over, more and more medical and surgical conferences will be held with telemedicine.

Medicine-2: Surgery



Masafumi NAKAMURA

Professor, Department of Surgery and Oncology,
Kyushu University

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URL: <http://www.surg1.med.kyushu-u.ac.jp/>

Research Expertise

HPB surgery, Cancer biology of pancreatic cancer, minimally invasive surgery for HPB

Academic Background

- 1982-1988 M.D., Faculty of Medicine, Kyushu University, Japan.
- 1995-1999 Ph.D. (Medical Science), Graduate School of Medical Sciences, Kyushu University
- 1999-2001 Research Fellow, Cancer Biology Program, Harvard University

Professional Appointments

- 1988-1992 Resident, Dept. Surgery1, Kyushu Univ. and affiliated hospitals, Fukuoka, Japan
- 1992-1995 Resident, National Cancer Center Hospital, Tokyo, Japan
- 2001-2003 The head surgeon, Shin-Kokura Hospital, Kitakyushu, Japan
- 2003-2011 Assistant Professor, (2005-Associate Prof.) Kyushu University
- 2011-2015 Chairperson and Professor, Dept. Digestive Surgery, Kawasaki Medical School, Kurashiki, Japan
- 2015- Chairperson and Professor, Dept. Surgery and Oncology, Kyushu University
- 2018- Vice-President of Kyushu University Hospital

Selected Publications

1. Endo S, Nakata K, Nakamura M (last) et al. Autophagy is Required for Activation of Pancreatic Stellate Cells, Associated With Pancreatic Cancer Progression and Promotes Growth of Pancreatic Tumors in Mice.
Gastroenterology, 152(6):1492-1506, 2017
2. Ryo A, Nakamura M, Wulf G, Liou YC, Lu KP. Pin1 regulates turnover and subcellular localization of beta-catenin by inhibiting its interaction with APC.
Nat Cell Biol. 2001 Sep;3(9):793-801.
3. Nakamura M, Masuda H, Horii J, et al., When overexpressed, a novel centrosomal protein, RanBPM, causes ectopic microtubule nucleation similar to gamma-tubulin.
J Cell Biol. 1998 Nov 16;143(4):1041-52.
4. Ohba T, Nakamura M, Nishitani H, Nishimoto T. Self-organization of microtubule asters induced in *Xenopus* egg extracts by GTP-bound Ran.
Science. 1999 May 21;284(5418):1356-8.

Medicine-2: Surgery



Kohei NAKATA

Lecturer, Department of Surgery and Oncology, Kyushu University

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Research Expertise

HBP cancer Laparoscopic surgery
Molecular biology in pancreatic cancer

Academic Background

2000 M.D. Kyushu University, Fukuoka, Japan.
2009 Ph.D. Kyushu University, Fukuoka, Japan

Professional Appointments;

2020- Lecturer in the Dept. of Surgery, Kyushu University Hospital, Fukuoka
2015-2020 Assistant professor in the Dept. of Surgery, Kyushu University Hospital, Fukuoka
2014-2015 Staff in the Dept. of Surgery, Hamanomachi Hospital, Fukuoka, Japan
2011-2014 Assistant professor in the Dept. of Surgery, Kyushu University Hospital, Fukuoka
2010-2011 Research fellow at Massachusetts General Hospital, Harvard University, MA, USA
2009-2010 Research fellow of the Japan Society for the promotion
2006-2009 Postgraduate Student of Graduate School of Medical Sciences of Kyushu University
2000- Dept. of Surgery, Kyushu University Hospital, Fukuoka, Japan

Selected Publications

1. Nakata K, Shikata S, Ohtsuka T et al. Minimally invasive preservation versus splenectomy during distal pancreatectomy: a systematic review and meta-analysis. *J Hepatobiliary Pancreat Sci.* 2018 Nov;25(11):476-488. doi: 10.1002/jhbp.569. Epub 2018 Aug 16.
2. Endo S, Nakata K, Ohuchida K et al. Autophagy is Required for Activation of Pancreatic Stellate Cells, Associated With Pancreatic Cancer Progression and Promotes Growth of Pancreatic Tumors in Mice. *Gastroenterology*, 152(6):1492-1506, 2017
3. Nakata K, Nagai E, Ohuchida K et al. Technical feasibility of laparoscopic total gastrectomy with splenectomy for gastric cancer: clinical short-term and long-term outcomes. *Surg Endosc* 29(7):1817-22, 2014

Laparoscopic Pancreatectomy based on the Precision Anatomy

Kohei NAKATA, Masafumi NAKAMURA

Abstract

Since laparoscopic pancreatectomy was first reported in 1992, it has gained popularity over the years. Several systematic reviews and cohort studies showed that laparoscopic pancreatectomy had better or comparable perioperative outcomes compared with open pancreatectomy. However, it has not gained widespread acceptance compared with other laparoscopic surgeries. This is due to the difficulty of pancreatectomy in laparoscopic procedure and the difficulty of laparoscopic pancreatectomy would be caused by the frequency of concomitant pancreatitis and anatomical complexity around pancreas. Several international meetings regarding MIPR have been held in 2010s. However, surgical anatomy of pancreas to safely perform MIPR has not yet been fully discussed. There have been reports and case series published regarding anatomical variations around pancreas and the relationships between anatomical variation and perioperative result of pancreatoduodenectomy (PD) was also reported. We carried out a systematic review of these articles and shows the importance to identify the anatomical variation for PD. We also show the knock and pit fall of laparoscopic pancreatectomy.

SNU – KYUSHU JOINT SYMPOSIUM Satellite Session

- **Session Theme** : Medicine-3: Elderly Care in Korea and Japan: Current Issues and Future Prospects
- **Date & Time** : 16:00-17:00, September 9
- **Organized by** : (SNU)

Cheol Ho KIM, M.D., Ph.D.

Professor, Department of Internal Medicine, College of Medicine, Seoul National University
(Kyushu)

Masa HIGO, Ph.D.

Professor, The International Student Center, Kyushu University
Module Ageing & Later Life, Medicine and Health Cluster, Kyushu University Institute for Asian and Oceanian Studies (Q-AOS)

- **Time Schedule**

Time	Specific Schedule	Speaker
16:00-16:10	Greetings and Introductory Remarks	Masa HIGO, Ph.D.
16:10-16:30	Presentation 1: <i>How to Improve the Quality of Care in Aged Society: A Focus on Comprehensive Geriatric Assessment</i>	Cheol Ho KIM, M.D., Ph.D.
16:30-16:50	Presentation 2: <i>Geriatric Telemedicine: Why Is a 'Hyper-Aged' Japan Slow in Adopting It?</i>	Masa HIGO, Ph.D.
16:50-17:00	Q&A	Cheol Ho KIM, M.D., Ph.D. Masa HIGO, Ph.D.

Medicine-3: Elderly Care in Korea and Japan: Current Issues and Future Prospect



Masa HIGO, Ph.D.

Professor, The International Student Center, Kyushu University

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URL: <https://hyoka.ofc.kyushu-u.ac.jp/search/details/K005560/english.html>

Research Expertise

Social Gerontology; Public Policy; Welfare State

Academic Background

Ph.D. in Sociology, Boston College, Massachusetts, USA

M.A. in Sociology, University of Central Missouri, Missouri, USA

B.A. in Sociology, University of Central Missouri, Missouri, USA

Professional Appointments

- 2019 – Present: Chief Researcher, Module Ageing & Later Life, Medicine and Health Cluster, Kyushu University Institute for Asian and Oceanian Studies
- 2016 – Present: Professor, The International Student Center, Kyushu University
- 2014 – 2016: Associate Professor, The International Student Center, Kyushu University
- 2012 – 2014: Associate Professor, Department of Sociology and Gerontology, The University of Central Missouri
- 2012 – 2014: Director, UCM Gerontology Institute, Department of Sociology and Gerontology, The University of Central Missouri
- 2011 – 2012: Associate Professor, Department of Social Sciences, Anderson University
- 2010 – 2011: Assistant Professor, Department of Social Sciences, Anderson University
- 2008 – 2010: Assistant Research Director, Boston College Sloan Center on Aging and Work, Boston College
- 2008 – 2009: Assistant Professor, Department of Communications, Emerson College
- 2007 – 2008: Lecturer, Department of Social Systems, Pine Manor College
- 2006 – 2008: Researcher, Center for Retirement Research, Boston College
- 2006 – 2008: Lecturer, Department of Humanities and Sciences, Montserrat College of Art

Selected Publications

<Selected Books>

- Higo, M. (forthcoming) *Ageing and Work in an Ageing Japan: An International Perspective*, Bristol University Press.
- Klassen, T. R., M. Higo, N. S. Dhirathiti & T. W. Devasahayam (2018) *Ageing in Asia-Pacific: Interdisciplinary and Comparative Perspectives*, Routledge, New York.
- Higo, M. & Klassen, T.R. (2015). *Retirement in Japan and South Korea: The Past, Present, and Future of Mandatory Retirement*. New York: Routledge.

<Selected Peer-Reviewed Articles>

- Higo, M. (Forthcoming) Japan's Approach to Retirement Reform: An International Perspective, *Polish Journal of Gerontology*.
- Higo, M & T. R. Klassen (2018) Reforms of retirement policies: three common paths in aging in Japan and Korea, *Journal of Aging and Social Policy*, 29(1) 70-83.
- Higo, M. and H. T. Khan (2015) Global population aging: Unequal distribution of risks in later life between developed and developing countries, *Global Social Policy*, 15(2) 146-166.
- Higo, M. (2013). 'Older Worker Labor Force Participation: Comparing the National Contexts of Japan and the United States,' *Journal of Population Ageing*. 6(4): 305-322.

Geriatric Telemedicine: Why Is a 'Hyper-Aged' Japan Slow in Adopting It?

Masa HIGO, Ph.D.

Abstract

'Geriatric telemedicine' refers to the use of information technology and telecommunications to address the health needs of the elderly at distance and in a cost-efficient manner. Over the past three decades, population ageing has pressured most countries around the world to find ways to mitigate the ever-mounting economic burdens, and its associated social challenges, of continuing to provide the elderly with quality healthcare. In this global context, the pressure Japan faces today is greater than for any other country; since the mid-1990s Japan has been the world's forerunner of rapid population ageing and will continue to lead the rest of the world in this demographic shift in coming decades. Despite such apparent urgency to proactively utilize geriatric telemedicine, however, its use in the country has to date remained notably minimal. This presentation aims to explain, albeit preliminarily, reasons why a 'hyper-aged' Japan has thus far been inactive and slow to adopt geriatric telemedicine. Primarily, reasons may be found in five areas from a sociological perspective: (1) current legal frameworks; (2) financial disincentives to healthcare providers; (3) physician's cultural attitudes; (4) limited ICT literacy among elderly patients; and (5) lack of mediators between elderly patients and telemedicine.

Medicine-3: Elderly Care in Korea and Japan: Current Issues and Future Prospect



Cheol Ho KIM, M.D., Ph.D.

Professor, Internal Medicine, Seoul National University,
College of Medicine

Contact Email: cheolkim55@gmail.com

Research Expertise

Hypertension; Geriatrics; Cardiology

Academic Background

1988 - Ph.D. from Seoul National University

1980 - Graduated from Seoul National University College of Medicine

Professional Appointments

- 1993- present Lecturer/Assistant/Associate/Professor Seoul National University College of Medicine
- 1992-1993 Research Associate Department of Physiology and Biophysics, Mayo Foundation US MN
- 1999 Visiting Doctor, Tokyo Metropolitan Geriatric Center
- 2004-2006 President of Korean Geriatric Society
- 2015-2017 President of Korean Hypertension Society
- 2013-2016 Vice President of Seoul National University Bundang Hospital

Selected Publications for 3 years

2020

- Choi JY, Kim KI, Choi Y, et al. Comparison of multidimensional frailty score, grip strength, and gait speed in older surgical patients. *J Cachexia Sarcopenia Muscle*. 2020;11(2):432-440. doi:10.1002/jcsm.12509
- Cho HW, Kang SH, Kim CH. Medication persistence and adherence: A key approach to improve hypertension management [published online ahead of print, 2020 Feb 24]. *Eur J Prev Cardiol*. 2020;2047487320905191. doi:10.1177/2047487320905191

2019

- Choi YJ, Kim SH, Kang SH, et al. Short-term effects of air pollution on blood pressure. *Sci Rep*. 2019;9(1):20298. Published 2019 Dec 30. doi:10.1038/s41598-019-56413-y
- Kang SH, Kim SH, Cho JH, et al. Prevalence, Awareness, Treatment, and Control of Hypertension in Korea. *Sci Rep*. 2019;9(1):10970. Published 2019 Jul 29. doi:10.1038/s41598-019-46965-4
- Kang MG, Kim KI, Ihm SH, et al. Fimasartan versus perindopril with and without diuretics in the treatment of elderly patients with essential hypertension (Fimasartan in the Senior Subjects (FITNESS)): study protocol for a randomized controlled trial. *Trials*. 2019;20(1):389. Published 2019 Jul 1. doi:10.1186/s13063-019-3466-5

- Choi JY, Kim KI, Kang MG, et al. Impact of a delirium prevention project among older hospitalized patients who underwent orthopedic surgery: a retrospective cohort study. *BMC Geriatr.* 2019;19(1):289. Published 2019 Oct 26. doi:10.1186/s12877-019-1303-z
- Choi JY, Kang MG, Park KU, et al. Immunogenicity of the Varicella-Zoster Vaccine in Community-Dwelling Non-robust Elderly Individuals Compared to Robust Elderly Individuals: A Prospective Cohort Study. *J Gerontol A Biol Sci Med Sci.* 2019;74(8):1225-1230. doi:10.1093/gerona/gly287
- Choi YJ, Kim SH, Kang SH, et al. Reconsidering the cut-off diastolic blood pressure for predicting cardiovascular events: a nationwide population-based study from Korea. *Eur Heart J.* 2019;40(9):724-731. doi:10.1093/eurheartj/ehy801
- Ihm SH, Shin J, Park CG, Kim CH. Efficacy of a fixed dose combination of irbesartan and atorvastatin (Rovelito®) in Korean adults with hypertension and hypercholesterolemia. *Drug Des Devel Ther.* 2019;13:633-645. Published 2019 Feb 13. doi:10.2147/DDDT.S191973
- Kim KI, Kang MG, Yoon SJ, Choi JY, Kim SW, Kim CH. Relationship between Within- Visit Blood Pressure Variability and Skeletal Muscle Mass. *J Nutr Health Aging.* 2019;23(1):79-83. doi:10.1007/s12603-018-1115-4
- Jung MH, Shin ES, Ihm SH, Jung JG, Lee HY, Kim CH. The effect of alcohol dose on the development of hypertension in Asian and Western men: systematic review and meta-analysis [published online ahead of print, 2019 Dec 6]. *Korean J Intern Med.* 2019;10.3904/kjim.2019.016. doi:10.3904/kjim.2019.016

2018

- Lee JH, Kim SH, Kang SH, et al. Blood Pressure Control and Cardiovascular Outcomes: Real-world Implications of the 2017 ACC/AHA Hypertension Guideline. *Sci Rep.* 2018;8(1):13155. Published 2018 Sep 3. doi:10.1038/s41598-018-31549-5
- Choi JY, Kim SW, Yoon SJ, Kang MG, Kim KI, Kim CH. Impact of frailty on do-not-resuscitate orders and healthcare transitions among elderly Koreans with pneumonia. *Clin Interv Aging.* 2018;13:2237-2245. Published 2018 Nov 1. doi:10.2147/CIA.S181400
- Jung HW, Kang MG, Choi JY, et al. Simple Method of Screening for Frailty in Older Adults Using a Chronometer and Tape Measure in Clinic. *J Am Geriatr Soc.* 2018;66(1):157-160. doi:10.1111/jgs.15204

How to Improve the Quality of Care in Aged Society: A Focus on Comprehensive Geriatric Assessment

Cheol Ho KIM, M.D., Ph.D.

Abstract

As the population ages and diminishes in number, a proportion of the elderly sharply increases resulting in the increase in surgical cases in hospital care. But surgery disturbs homeostatic mechanism of the subjects, resulting in many problems such as delirium, malnutrition or electrolyte imbalance. Division of Geriatrics in Seoul National University Bundang Hospital started to perform comprehensive geriatric assessment (CGA) from 2003 along with the joint efforts of surgeons performed CGA before operation. Much of the results were accumulated and reported in published articles. At this occasion, current situations of population aging with diminishing number will be briefly introduced and the advantage and limitation of preoperative CGA will be discussed in some depth.



Session 2 :
**Spatial and Environmental
Economics**

SNU – KYUSHU JOINT SYMPOSIUM Satellite Session

- **Session Theme** : Environmental and Social Sustainability at Different Spatial Scales
- **Date & Time** : 14:00-17:40, September 9
- **Meeting System (If decided)** : Online session using the Zoom
- **Organized by** : (SNU)

Professor Euijune KIM

(Kyushu)

Professor Shigemi KAGAWA

- **Time Schedule**

Time	Specific Schedule	Speaker
14:00-14:10	Opening talk	Shigemi KAGAWA
14:10-14:40	Session I	Hidemichi FUJII
14:40-15:10	Session I	Brian H.S. KIM
15:10-15:40	Session I	Euijune KIM
15:40-16:00	Break	
16:00-16:30	Session II	Shigemi KAGAWA
16:30-17:00	Session II	Tae-Hyoung Tommy GIM
17:00-17:30	Session II	Andrew CHAPMAN
17:30-17:40	Closing talk	Brian H.S. KIM

Environmental and Social Sustainability at Different Spatial Scales



Shigemi KAGAWA

Distinguished Professor, Faculty of Economics, Kyushu University

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URL: <https://sites.google.com/view/shigemi-kagawa>

Research Expertise

Environmental Economics, Environmental Management

Academic Background

Dr. (doctor) received in Mar 2001 at Tohoku University

Ph.D.: Graduate School of Information Sciences , Tohoku University, Japan (Apr 1999 – Mar 2001)

M.S.: Graduate School of Information Sciences , Tohoku University, Japan (Apr 1995 – Mar 1997)

B.S.: Undergraduate School of Engineering, Tohoku University, Japan (Apr 1991 – Mar 1995)

Professional Appointments

May 2020 – present: Distinguished Professor, Kyushu University, Japan

Apr 2016 – present: Professor, Faculty of Economics, Kyushu University, Japan

Oct 2006 – Mar 2016: Associate Professor, Faculty of Economics, Kyushu University, Japan

Oct 2003 – Sept 2006: Research Associate, Graduate School of Information Sciences, Tohoku University, Japan

Apr 2001 – Sept 2003: Researcher, National Institute for Environmental Studies, Japan

Selected Publications

M. Kito, F. Nagashima, S. Kagawa, K. Nansai, Drivers of CO₂ emissions in international aviation: the case of Japan, *Environmental Research Letters*, In press, 2020.

M. Yagi, S. Kagawa, S. Managi, H. Fujii, D. Guan, Supply Constraint from Earthquakes in Japan in Input–Output Analysis, *Risk Analysis*, In press, 2020.

S. Kagawa *et al.*, CO₂ emission clusters within global supply chain networks: Implications for climate change mitigation, *Global Environmental Change* 35, 486–496, 2015.

S. Kagawa *et al.*, Assessing CO₂ emission reduction potential of passenger vehicle replacement programs, *Global Environmental Change* 23, 1807–1818, 2013.

S. Kagawa *et al.*, Role of motor vehicle lifetime extension in climate change policy, *Environmental Science & Technology* 45, 1184–1191, 2011.

Toxic Chemical Emissions Footprint of NAFTA Nations

Shunsuke OKAMOTO¹, Hidemichi FUJII² and Shigemi KAGAWA^{2*}

¹ Onomichi City University, Onomichi, Japan

² Kyushu university, Fukuoka, Japan

* Corresponding author: kagawa@econ.kyushu-u.ac.jp

Abstract

This study investigates major driving forces of changing toxic chemical emissions in the NAFTA region. In doing it, we firstly estimated toxic chemical emissions of the NAFTA member countries triggered by the global final demand of countries. Secondly, we develop a structural approach to investigate the following five driving forces of chemical emission intensity, technology, intra-regional trade, bilateral trade, and final demand behind the changes in the toxic chemical emissions. Thirdly, based on the structural approach, we propose a simplified sign test based on the structural decomposition analysis whether or not the bilateral trade structure led to an increase in the toxic chemical emissions of a specific country. The major findings of this study are summarized as follows. We find that Mexico-U.S. bilateral trade effect on the chemical pollutions in Mexico increased more than 5 times from 2006 to 2013 and its magnitude was significant. With a careful look on the bilateral trade effects of intermediate goods within the NAFTA region, we conclude that the structural change in the bilateral trade within the NAFTA area rapidly led Mexico to a chemical pollution haven.

Environmental and Social Sustainability at Different Spatial Scales



Euijune KIM

Professor, Agricultural Economics and Rural Development,
Seoul National University

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URL: <https://specon.snu.ac.kr>

Research Expertise

Urban and Regional Economics, Policy Analysis of Infrastructure Management

Academic Background

Ph.D.: Regional Science, Cornell University, US (Aug 1987 – Mar 1991)

M.A.: Regional Science, Cornell University, US (Aug 1987 – Mar 1990)

M.E.: Urban Planning, Yonsei University, Korea (Mar 1985 – Feb 1987)

B.E.: Architectural Engineering, Yonsei University, Korea (Mar 1981 – Feb 1985)

Professional Appointments

Mar 2005 – present: Professor, Agricultural Economics and Rural Development, Seoul National University, Korea

Mar 1996 – Feb 2005: Professor, Urban Planning and Engineering, Yonsei University, Japan

Sep 1991 – Mar 1996: Research Fellow, Korea Research Institute for Human Settlements, Seoul, Korea

Sep 2017 – present: Visiting Research Professor, Urban Planning and Design, the University of Hong Kong

Feb 2003 – present: Research Professor, Regional Economics Applications Laboratory, University of Illinois, Urbana-Champaign

Selected Publications

Kim, Euijune and Yasir Niti Samudro (2017), "The Impact of Intergovernmental Transfer Funds on Interregional Income Disparity in Indonesia," *International Journal of Urban Sciences*, 21(1): 22-40.

Kim, Euijune, Geoffrey J.D. Hewings and Hidayat Amir (2017), "Economic Evaluation of Transportation Projects: an Application of Financial Computable General Equilibrium Model," *Research in Transportation Economics*, 61: 44-55.

Kim, Euijune and Yoojin Yi (2019), "Impact Analysis of High-speed Rail Investment on Regional Economic Inequality: A Hybrid Approach Using a Transportation Network-CGE Model," *Journal of Transport Economics and Policy*, 53(3): 238–257

Kim, Euijune, Seungwoon Moon and Shigemi Kagawa (2019), "Spatial Economic Linkages of Economic Growth and Air Pollution: Developing an Air Pollution-Multinational CGE Model of China, Japan, and Korea," *Annals of Regional Science*, 63(2):255-268

Dynamic Impacts of Housing Demand and Supply Policies on Seoul Housing Market

Euijune KIM ^{1*}, Ayoung KIM ², Hojune LEE ¹, Dongyeong JIN ¹ and Min JIANG ¹

¹ Seoul National University, Seoul, Korea

² Mississippi State University, Starkville, USA

* Corresponding author: euijune@snu.ac.kr

Abstract

This paper develops a framework for a dynamic economic analysis of fiscal and financial housing policies on the housing market in Korea. The framework integrates a Computable General Equilibrium (CGE) model with a housing market model. The housing model accounts for housing demand, investment, user costs and multiregional migration. The housing markets are disaggregated into four major regions; three regions (Seoul, Incheon and Gyeonggi) in Seoul Metropolitan Area and one rest of Korea to incorporate regional heterogeneity of the housing stocks. The policy simulations using the CGE model show that it would be more effective to control the interest rate and the capital gains tax rate together rather than to separately use only one option in order to reduce the inflation rate of Seoul housing price.

Environmental and Social Sustainability at Different Spatial Scales



Hidemichi FUJII

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Contact Email: hidemichifujii@econ.kyushu-u.ac.jp
URL: <https://sites.google.com/site/hidemichifujii/Home>

Research Expertise

Environmental Economics, Corporate Environmental Management, Productivity Analysis

Academic Background

Dr. (doctor) received in Mar 2009 at Hiroshima University

Ph.D.: Graduate School for International Development and Cooperation, Hiroshima University, Japan
(Apr 2006 – Mar 2009)

M.S.: Graduate School for International Development and Cooperation, Hiroshima University, Japan
(Apr 2004 – Mar 2006)

B.S.: Undergraduate School of Science, Hiroshima University, Japan (Apr 2000 – Mar 2004)

Professional Appointments

Apr 2018 – present: Associate Professor, Faculty of Economics, Kyushu University, Japan

Mar 2014 – Mar 2018: Associate Professor, Graduate school of Fisheries and Environmental Sciences, Nagasaki University, Japan

Apr 2013 – Feb 2014: Researcher, Fujitsu Laboratories, Japan

Apr 2010 – Mar 2013: JSPS Postdoctoral fellow, Graduate School of Environmental Studies, Tohoku University, Japan

Apr 2009 – Mar 2010: JSPS Postdoctoral fellow, IC² institute, University of Texas at Austin

Selected Publications

Fujii, H., Managi, S. (2019). Decomposition analysis of sustainable green technology inventions in China. *Technological Forecasting & Social Change* vol. 139 pp. 10-16.

Fujii, H., Managi, S. (2018). Trends and priority shifts in artificial intelligence technology invention: A global patent analysis. *Economic Analysis and Policy* vol. 58 pp. 60-69.

Fujii, H., Iwata, K., Chapman, A., Kagawa, S., Managi, S. (2018). An analysis of urban environmental Kuznets curve of CO₂ emissions: Empirical analysis of 276 global metropolitan areas. *Applied Energy* vol. 228 pp. 1561-1568.

Fujii, H., Kondo, Y. (2018). Decomposition analysis of food waste management with explicit consideration of priority of alternative management options and its application to the Japanese food industry from 2008 to 2015. *Journal of Cleaner Production* vol. 188 pp. 568-574.

How Does Information and Communication Technology Capital Affect Productivity in the Energy Sector?

Hidemichi FUJII *¹

¹ Kyushu university, Fukuoka, Japan

* Corresponding author: hidemichifujii@gmail.com

Abstract

By focusing on a distributed energy system that has been widely diffused for efficient utilization of renewable energy generation in recent years, this paper investigates the relationship between productivity growth and information and communications technology capital in the energy sector. Information and communications technology is a key factor in operating distributed energy systems in a way that balances energy supply and demand in order to minimize energy loss and to enhance capacity utilization. The objective of this study is to clarify the determining factors that affect productivity growth, focusing on three different information and communications technologies: information technology capital, communication technology capital and software capital. Our estimation sample covers energy sectors in 14 countries from 2000 to 2014. The results show that information technology and software capital contribute to increasing material productivity and capital productivity in the energy sector, respectively. Meanwhile, communication technology capital negatively affects these two productivity indicators.

Environmental and Social Sustainability at Different Spatial Scales



Brian H.S. KIM

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Seoul National University

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URL: <https://calslab.snu.ac.kr/saelab>

Research Expertise

Sustainable Development, Applied Economics, Economic Valuation and Assessment

Academic Background

Ph.D.: Regional Science, Cornell University, US (Sept. 1995 – Jan 2003)

M.S.: Regional Science, Cornell University, US (Sept. 1995 – Jan 1998)

M.A.: Economics, New York University, US (Sept 1989 – Oct 1991)

B.A.: Economics and Mathematics, New York University, US (Sept 1985 – Oct 1989)

Professional Appointments

Mar 2009 – present: Professor, Agricultural Economics and Rural Development, Seoul National University, Korea

Mar 2005 – Feb 2009: Assistant Professor, Urban Planning and Engineering, Yonsei University, Japan

Feb 2004 – Feb 2005: Program Evaluator, National Assembly Budget Office, Seoul, Korea

Nov 2002 – Feb 2004: Research Fellow, The Korea Transport Institute, Korea

Selected Publications

Hyunji Lee, Insu Chang and Brian H.S. Kim (Corresponding Author). 2019. "Specialist perception on particulate matter policy in Korea: causal relationship analysis with Q-methodology and system thinking", *The Annals of Regional Science*. Vol. 63, No. 2, pp 341-373. October 2019.

Insu Chang and Brian H.S. Kim (Corresponding Author). 2019. "Regional disparity of medical resources and its effect on age-standardized mortality rates in Korea", *The Annals of Regional Science*. Vol. 62, pp 305-325. April 2019.

So Yoon Kim and Brian H.S. Kim (Corresponding Author). 2017. "The Effect of Urban Green Infrastructure on Disaster Mitigation in Korea", *Sustainability* 2017, 9, 1026. June 2017.

Kichan Nam and Brian H.S. Kim (Corresponding Author). 2017. "The Effect of Spatial Structure and Dynamic Externalities on Local Growth in Seoul Metropolitan Area", *Urban Policy and Research*. Vol.35 no.2, pp.165-179. June 2017.

Dong Jin Shin and Brian H.S. Kim (Corresponding Author). 2017. "Impacts of household loan regulation on financial stability: evidence from Korea", *Asian-Pacific Economic Literature*. Vol. 31 no.1, pp. 53-65. May 2017.

Regional Disparity of Medical Resources and Its Effect on Age-Standardized Mortality Rates in Korea

Brian H.S. KIM ^{1*} and Insu CHANG ²

¹ Seoul National University, Seoul, Korea

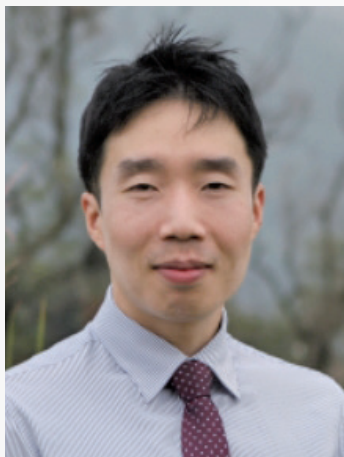
² Korea Institute for Health and Social Affairs, Sejong, Korea

* Corresponding author: briankim66@snu.ac.kr

Abstract

The progress in medical resources and technologies has played an important role in improving people's health. Various indicators can be used to measure the health level of a country. The mortality rate is a clinical result of health and medical sectors that quantitatively displays the state or change in health levels. The effectiveness of medical resources can be quantitatively determined with the changes in mortality rate and can represent the health level of a region. In this study, 16 cities and provinces in Korea for the years from 2001 to 2014 are set as spatial and temporal scopes. Doctors, medical personnel, specialists, and number of operations are introduced as human medical resources. The number of hospital beds and number of medical facilities represent physical resources, while the high-end medical equipment represents technical advancements. The result from panel analyses indicated that all medical resources considered in this study reduces age-standardized mortality rate, with medical facilities having the greatest influence, followed by specialists, then by high-end medical equipment. These results can be interpreted to suggest that medical resources and regional economic characteristics compositely have reducing the effect on mortality rate.

Environmental and Social Sustainability at Different Spatial Scales



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Seoul National University

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Research Expertise

Land Use–Transportation–Environment Interactions, Spatial Analysis

Academic Background

Ph.D.: City and Regional Planning, Georgia Institute of Technology, US (Aug 2005 – Dec 2013)

M.C.P.: Environmental Management, Seoul National University, Korea (Mar 2001 – Feb 2003)

B.A.: Geography Education, Korea University, Korea (Mar 1996 – Aug 2000)

Professional Appointments

Mar 2015 – present: Associate Professor, Environmental Planning, Seoul National University, Korea

Sep 2014 – Jan 2015: Assistant Professor, City and Regional Planning, King Fahd University of Petroleum and Minerals, Saudi Arabia

Aug 2012 – Feb 2013: Lecturer, Geography Education, Korea University, Korea

Selected Publications

Gim, Tae-Hyoung Tommy and Joonho Ko (2017), "Maximum Likelihood and Firth Logistic Regression of the Pedestrian Route Choice," *International Regional Science Review*, 40(6): 616-637.

Gim, Tae-Hyoung Tommy (2018), "SEM Application to the Household Travel Survey on Weekends Versus Weekdays: The Case of Seoul, South Korea," *European Transport Research Review*, 10: 11.

Gim, Tae-Hyoung Tommy (2018), "Land Use, Travel Utility, and Travel Behavior: An Analysis from the Perspective of the Positive Utility of Travel," *Papers in Regional Science*, 97(S1): S169-S192.

Gim, Tae-Hyoung Tommy (2019), "Examining the Effects of Residential Self-Selection on Internal and External Validity: An Interaction Moderation Analysis Using Structural Equation Modeling," *Transportation Letters*, 11(5): 275-286.

Gim, Tae-Hyoung Tommy (2020), "Analyzing the Effects of Land Use on the Choice of Intra-Zonal Trip Destinations: A Comparison between Weekday and Weekend Travel," *Promet*, 32(4): 527-542.

Gim, Tae-Hyoung Tommy (2020), "The Relationship between Overall Happiness and Perceived Transportation Services Relative to Other Individual and Environmental Variables," *Growth and Change*, 51(2): 712-733.

What Makes Seoul People Happy? PLS Regression of Five-year Data of the Seoul Survey

Tae-Hyoung Tommy GIM ^{*1}

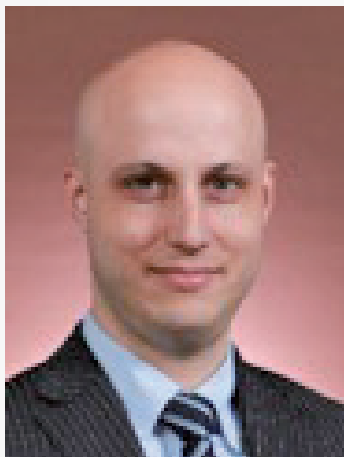
¹ Seoul National University, Seoul, Korea

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Abstract

Comprising five happiness indicators [health-related happiness, financial happiness, relational happiness (considering relatives and friends), home-based life happiness, and social life happiness], overall happiness among residents in Seoul, Korea is investigated through partial least squares structural equation modeling, using five-year data of the Seoul Survey (2013–2017), representing a total of 228,103 persons. The empirical analysis finds that pride as a Seoul citizen, socioeconomics perception, survey years other than 2014, income, and non-elderliness have positive effects on the happiness in descending order of their magnitudes. The finding that the subjective socioeconomics outvalues the objective income implies the effectiveness of city marketing policies for higher happiness. Why the happiness was particularly low in 2014 may suggest the history effect of a national tragedy on the collapse of MV Sewol and economic and mental trauma afterward. Results on other variables confirm that happiness determinants have differing effects between Northeast Asia (e.g., Korea and Japan) and the West.

Environmental and Social Sustainability at Different Spatial Scales



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Research Expertise

Energy Analysis, Social Equity, Energy Policy

Academic Background

Dr. (doctor) received in Sept 2016 at Kyoto University

Ph.D.: Graduate School of Energy Science, Kyoto University, Japan (Oct 2013-Sep 2016)

M.S.: Graduate School of Humanities and Social Sciences, University of Queensland, Australia (2009-2012)

B.S.: College of Business, Government and Law, Flinders University, Australia (2004-2007)

Professional Appointments

Jan 2019 – present: Associate Professor, Kyushu University, Japan

Oct 2016 – Dec 2018: Assistant Professor, Kyushu University, Japan

Apr 2008 – Apr 2013: Senior Policy Officer, Queensland State Government, Japan

Feb 2001 – Jul 2007: Company President, Chapsat Computers, Adelaide, Australia

Selected Publications

Chapman, A., Itaoka, K., Farabi-Asl, H., Fujii, Y., & Nakahara, M. (2020). Societal penetration of hydrogen into the future energy system: Impacts of policy, technology and carbon targets. *International Journal of Hydrogen Energy*, 45(7), 3883–3898.

Shigetomi, Y., **Chapman, A.**, Matsumoto, K., Nansai, K., Susumu, T. (2020). Quantifying lifestyle based social equity implications for national sustainable development policy. *Environmental Research Letters*, In Press.

Chapman, A., Fujii, H., & Managi, S. (2019). Multinational life satisfaction, perceived inequality and energy affordability. *Nature Sustainability*, 2(6), 508–514.

Chapman, A., & Shigetomi, Y. (2018). Developing national frameworks for inclusive sustainable development incorporating lifestyle factor importance. *Journal of Cleaner Production*, 200, 39–47.

Chapman, A., McLellan, B. C., & Tezuka, T. (2018). Prioritizing mitigation efforts considering co-benefits, equity and energy justice: Fossil fuel to renewable energy transition pathways. *Applied Energy*, 219, 187–198.

Renewable Energy Transitions and Social Equity: Evaluating the Equitable Transition

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Benjamin MCLELLAN ⁴, Akihiko SHINOZAKI ¹

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² Nagasaki university, Nagasaki, Japan

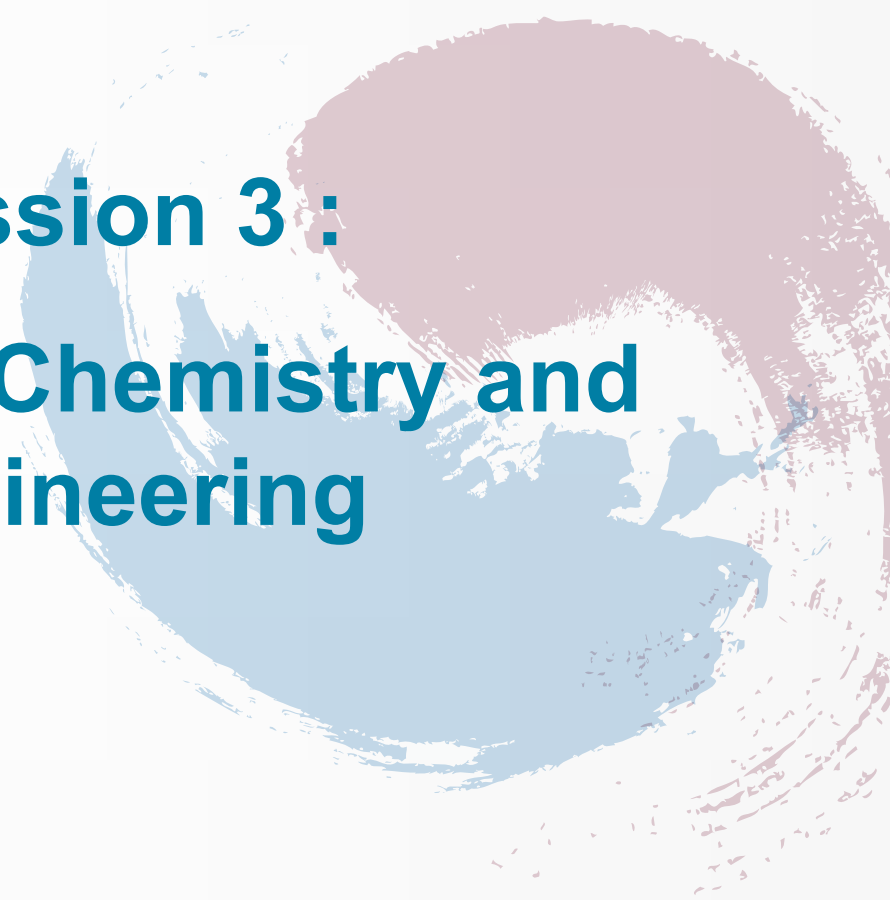
³ Tohoku university, Sendai, Japan

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Abstract

This research examines the societal impacts of varying energy policy approaches and the progress of the energy transition toward a renewable energy-based regime internationally. Using indicators relevant to energy policy and the energy transition, five critical social equity impacts of environmental improvement, health, employment, participation and energy cost are investigated from the viewpoint of an 'equitable' transition. We identify the quantitative social equity impacts of the shift toward renewable energy-based electricity from 1990 to 2015, for 99 nations with differing development levels, energy resources and policies. We find that increased levels of 'new' renewable energy deployment generally improve social equity for most nations. Further, richer nations enjoy better social equity outcomes as a result of deploying renewable energy and, regionally speaking, Northern European nations achieve superior results, while African nations lose out both for the transition and social equity outcomes overall. Our results are particularly important for developing nations, who face the 'development curse', whereby electricity needs are often met by fossil fuels prior to the large-scale penetration of renewables - engendering negative social equity outcomes. The holistic evaluation of energy transitions and social equity outcomes enables proactive policy development, contributing to the realization of an equitable energy transition.



Session 3 :
**Materials Chemistry and
Engineering**

SNU – KYUSHU JOINT SYMPOSIUM Satellite Session

- **Session Theme** : Materials Chemistry and Engineering
- **Date & Time** : 13:00-17:00, September 9
- **Organized by** : (SNU)
Yongsok SEO, Professor, Department of Materials Science and Engineering
 (Kyushu)
Atsushi TAKAHARA, Professor, Institute for Materials Chemistry and Engineering

• **Time Schedule**

Time	Specific Schedule	Speaker
13:00	Opening	Prof. Yongsok SEO
13:05	Chemical Modification of Single-walled Carbon Nanotubes for Near Infrared Photoluminescence Nanomaterial Fabrication	Prof. Tomohiro SHIRAKI
13:30	A Multi-scale Approach for Predicting Mechanical Properties of Metals under Mechanical-thermal-metallurgical Processes	Prof. Myoung-Gyu LEE
13:55	Head-to-Tail Carbazole Derivatives as Photonic and Electronic Materials	Prof. Ken ALBRECHT
14:20	Visible-light Driven RAFT Polymerization	Prof. Min Sang KWON
14:45	Break	
15:00	Efficient Organic Photonic Devices by Manipulating Triplet Excited States	Prof. Ken-ichi GOUSHI
15:25	Ion-to-Ion Amplification through an Open Junction Ionic Diode	Prof. Jeong-Yun SUN
15:50	Development of Homogeneous Plastic Antibodies; Well-defined Polymer Ligands that Bind and Neutralize Toxicity of Target Peptide	Prof. Yu HOSHINO
16:15	Bioresorbable Electronics for Minimally Invasive Medical Sensing and Treatment of Nervous System	Seung-Kyun KANG
16:40	Closing	Prof. Atsushi TAKAHARA

Materials Chemistry and Engineering



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Research Expertise

Surface and Interfacial Properties of Polymers, Polymer Brushes, Polymer-Natural Clay Nanohybrids, Fatigue and Fracture in Polymers, Application of Quantum Beam Polymer Science, Microplastics

Academic Background

B.S. Kyushu University, 1978

Ph.D. Kyushu University, 1983

Professional Appointments

Professor, Kyushu University (1999 - present)

Member, The Science Council of Japan, Associate Member (2005-2008, 2011-2017)

President, The Society of Polymer Science, Japan (2014-2016)

President, The Materials Research Society of Japan (2017-2019)

Senior Editor, *Langmuir* (ACS, 2016-present)

Awards:

1999 Fiber Society Scientific Award, The Society of Fiber Science & Technology, Japan,

2003 Polymer Science Award, The Society of Polymer Science, Japan

2013 Rheology Award, The Society of Rheology, Japan

2014 ACS FLUOROPOLYMER 2014 3M Award

2014 APS Fellow

2016 RSC Fellow

2018 2017 The Outstanding Achievement Award, The Society of Polymer Science, Japan

Selected Publications

1. M. Mukai, C-H. Cheng, W. Ma, M. Chin, C-H. Lin, S-C. Luo, A. Takahara, Synthesis of Conductive Polymer Thin Film Having Choline Phosphate Side Group and Their Bioadhesive Properties, *Chem. Comm.*, 56, 2691-2694 (2020). (with Cover)
2. Y. Zhang, K. Hasegawa, S. Kamo, K. Takagi, W. Ma, A. Takahara, Enhanced Adhesion Effect of Epoxy Resin on Metal Surfaces Using Polymer with Catechol and Epoxy Groups, *ACS Appl. Polym. Sci.*, 2, 1500-1507(2020)
3. M. Mukai, D. Ihara, C.W. Chu, C.H. Cheng, A. Takahara, Synthesis and Hydration Behavior of a Hydrolysis-Resistant Quasi-Choline Phosphate Zwitterionic Polymer, *Biomacromolecules*, 21, 2125-2131 (2020)
4. C.-H. Cheng, S. Masuda, S. Nozaki, C. Nagano, T. Hirai, K. Kojio, A. Takahara, Fabrication and Deformation of Mechanochromic Nanocomposite Elastomers based on Rubbery and Glassy Block Copolymer-Grafted Silica Nanoparticles, *Macromolecules*, 53, 4541-4551(2020).
5. A. Takahara, Y. Higaki, T. Hirai, R. Ishige, Application of Synchrotron Radiation X-ray Scattering and Spectroscopy to Soft Matter, *Polymers*, 12, 1624 (2020). (Focus Review)
6. Y. Higaki, M. Kobayashi, A. Takahara, Hydration State Variation of Polyzwitterion Brushes through Interplay with Ions, *Langmuir*, 36, 9015-9024 (2020). (Focus Review) (Front Cover)

Materials Chemistry and Engineering



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Research Expertise

Polymer nano composites, Surface and Interfacial Properties of Polymeric Composite Materials, Polymer Physics, Rheology and Polymer Processing, Functional Polymeric Composite Materials.

Academic Background

B.S. Seoul National University, 1977

M.S. Chemical Eng. U. Texas (Austin), 1984

Ph.D. Chemical Eng. U. Texas (Austin), 1987

Professional Appointments

1987-1989 U Texas (Austin) Post Doc.

1989-2003 Korea Institute of Science & Technology, Senior Researcher/Principal Researcher

2004-to date Seoul National University, Associate professor & Professor

2010, 2017 JSPS Fellow, Kyushu University

Selected Publications

1. Novel Dual Curing Process for a Stereolithographically Printed Part Triggers A Remarkably Improved Interlayer Adhesion and Excellent Mechanical Properties, *Langmuir*, 2020, 36, 9250–9258.
2. Analysis of the flow behavior of electrorheological fluids containing polypyrrole nanoparticles or polypyrrole/silica nanocomposite particles, *Rheologica Acta*, 2020, 59, pages415–423
3. Multilayer Structuring of Nonleaded Metal (BiSn)/Polymer/Tungsten Composites for Enhanced γ -Ray Shielding, *Adv. Eng. Materials*, 2020, June, 1901448 (<https://doi.org/10.1002/adem.201901448>)
4. Suspensions of Hollow Polydivinylbenzene Nanoparticles Decorated with Fe₃O₄ Nanoparticles as Magnetorheological Fluids for Microfluidics Applications, *ACS Applied Nano Materials*, 2,11 (2019)
5. Optimum Thermoelectric Performance of Bismuth-Antimony-Telluride Alloy/PEDOT: PSS Nanocomposites Prepared by a Novel Redox Process, *ACS Applied Energy Materials*, 2,11 (2019)
6. Electromagnetic Interference (EMI) shielding by Fe-Si-Al alloy/MWCNT/polymer nanocomposites, *Langmuir*, 35 (21), 6950-6955 (2019)
7. Searching for Stable High-Performance Magnetorheological Suspensions *Advanced Materials*, 2018, 30, 1704769
8. High-Performance Magnetorheological Suspensions of Pickering-Emulsion-Polymerized Polystyrene/Fe₃O₄ Particles with Enhanced Stability, *Langmuir*, 2018, 34, 2807–2814
9. Fracture Mechanism Change at a Heterogeneous Polymer–Polymer Interface Reinforced with in Situ Graft Copolymers, *Langmuir* 2018, 34, 11027–11033

Materials Chemistry and Engineering



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Research Expertise

Nanocarbon chemistry
Supramolecular/polymer chemistry

Academic Background

Postdoc. University of Illinois at Urbana-Champaign (Jeffrey. S. Moore group), JSPS Postdoctoral Fellow for Research Abroad, 2012-2014

Postdoc. Institute of Systems, Information Technologies and Nanotechnologies (ISIT) (Supervisor: Prof. Seiji Shinkai), 2008 - 2012

Ph.D. Kyushu University (Supervisor: Prof. Nobuo Kimizuka), 2008

M.S. Kyushu University (Supervisor: Prof. Norio Nemoto), 2003

B.S. Kyushu University (Supervisor: Prof. Norio Nemoto), 2001

Professional Appointments

Kyushu University, Associate Professor (2018 – present)

Kyushu University, Assistant Professor (2014 –2018)

Kyushu University, International Institute on Carbon-Neutral Energy Research (I²CNER) (2014 – present)

Selected Publications

1. T. Shiraki, Y. Miyauchi, K. Matsuda, N. Nakashima, *Acc. Chem. Res.*, **2020**, in press. DOI : 10.1021/acs.accounts.0c00294
2. G. Kim, T. Shiraki, T. Fujigaya, *Bull. Chem. Soc. Jpn*, **2020**, 93, 414.
3. T. Shiraki, Y. Niidome, F. Toshimitsu, T. Shiraishi, T. Shiga, B. Yu, T. Fujigaya, *Chem. Commun.*, **2019**, 55, 3662.
4. T. Shiraki, B. Yu, T. Shiraishi, T. Shiga, T. Fujigaya, *Chem. Lett.*, **2019**, 48, 791.
5. T. Shiraki, T. Shiga, T. Shiraishi, H. Onitsuka, N. Nakashima, T. Fujigaya, *Chem. Eur. J.*, **2018**, 24, 19162.
6. H. Onitsuka, T. Fujigaya, N. Nakashima, T. Shiraki, *Chem. Eur. J.* **2018**, 24, 9393.
7. T. Shiraki, S. Uchimura, T. Shiraishi, H. Onitsuka, N. Nakashima, *Chem. Commun.* **2017**, 53, 12544.
8. T. Shiraishi, T. Shiraki, N. Nakashima, *Nanoscale* **2017**, 9, 16900.
9. G. Kim, J. Yang, N. Nakashima, T. Shiraki, *Chem. Eur. J.* **2017**, 23, 17504.
10. T. Shiraki, H. Onitsuka, T. Shiraishi, N. Nakashima, *Chem. Commun.* **2016**, 52, 12972.
11. T. Shiraki, T. Shiraishi, G. Juhász, N. Nakashima, *Sci. Rep.* **2016**, 6, 28393.

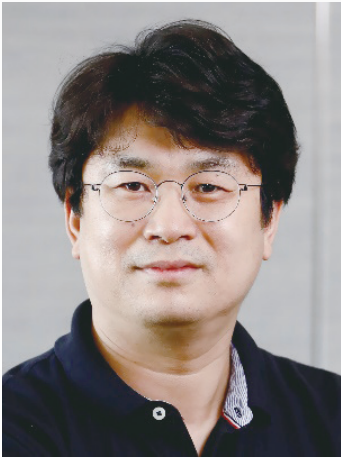
Chemical Modification of Single-walled Carbon Nanotubes for Near Infrared Photoluminescence Nanomaterial Fabrication

Tomohiro SHIRAKI

Abstract

Carbon nanotubes (CNTs) are promising nanomaterials due to their remarkable electronic, optical, mechanical and thermal properties. Especially, single-walled CNTs (SWNTs) with semiconducting features emit photoluminescence (PL) in near infrared (NIR) regions. The NIR PL appears by a radiative relaxation process of the exciton produced by photoexcitation of the tubes. The unique one-dimensional nanostructures allow the exciton to be stable even at room temperature and to migrate through the one-dimensional structures. As a new method to utilize the mobile excitons for PL enhancement, defect doping to SWNTs by local chemical functionalization has recently been developed. The locally functionalized SWNTs (lf-SWNTs) show additional PL (E_{11}^*) with red-shifted wavelengths and enhanced quantum yields compared to original PL (E_{11}) of pristine (non-modified) SWNTs. Therein, the local functionalization of the tubes creates emissive sites whose electronic structures are modified, giving narrower bandgaps and exciton trapping features. Interestingly, the modified molecules on the doped sites of lf-SWNTs are found to versatilely modulate their NIR PL properties. In this talk, our local chemical and supramolecular chemical approaches for lf-SWNT functionalization are presented, in which the wide-range of PL wavelength modulation and the dynamic wavelength shift/switching are achieved based on molecular chemistry.

Materials Chemistry and Engineering



Myoung-Gyu LEE

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Seoul National University

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Research Expertise

Mechanics of materials, finite element simulations, plasticity, material forming, multiscale simulations for structure materials, solid mechanics

Academic Background

Ph.D Seoul National University, 2004

M.S. Seoul National University, 1999

B.S. Seoul National University, 1997

Professional Appointments

Board members of Korean Society of Automotive Engineers, Korean Institute of Metals and Materials, Korean Society for Technology of Plasticity

Editorial board members of International Journal of Plasticity, Applied Sciences, Metals and Materials International, Korean Journal of Metals and Materials

Editor of International Journal of Automotive Technology

Guest editors of a special issue on International Journal of Plasticity (2015)

Chair of 38th International Deep Drawing Research Group (IDDRG 2020)

Organizers of symposium in ASME 2015 Applied Mechanics and Materials Conferences (McMat 2015), World Congress on Computational Mechanics (WCCM), TMS Annual Meeting & Exhibition etc.

Selected Publications

Kwansoo Chung and Myoung-Gyu Lee, "Basics of Continuum Plasticity", Springer

Chen SF, Li DY, Zhang SH, Han HN, Lee MG, Modelling Continuous Dynamic Recrystallization of Aluminum Alloys based on the Polycrystal Plasticity Approach, Int J Plasticity, 131, 102710 (2020)

Min KM, Jeong WJ, Hong SH, Lee CA, Cha P-R, Han HN, Lee MG, Integrated crystal plasticity and phase field model for prediction of recrystallization texture and anisotropic mechanical properties of cold-rolled ultra-low carbon steels, Int J Plasticity, 127, 102644 (2020)

Barlal F, Gracio J, Lee MG, Rauch EF, Vincze G, "An Alternative to Kinematic Hardening in Classical Plasticity", Int. J. Plasticity, 27, 1309-1327 (2011)

Barlal F., Ha JJ, Lee MG*, Gracio, J., Rauch EF, Vincze G., "Extension of Homogeneous Anisotropic Hardening Model to Cross-Loading with Latent Effects", Int J Plasticity, 46, 130-142 (2013)

A multi-scale approach for predicting mechanical properties of metals under mechanical-thermal-metallurgical processes

Myoung-Gyu LEE

Abstract

A multiscale approach coupling the crystal plasticity (CP) finite element simulation and the phase-field modeling (PFM) is proposed to predict mechanical properties of steels after a cold rolling process followed by the annealing heat treatment. In the proposed simulations, the grain size deformation of a polycrystalline metal by rolling and the subsequent microstructure evolutions with texture change during static recrystallization (or annealing) can be efficiently and accurately modeled. The virtual microstructure obtained after the two processes is applied to the prediction of mechanical properties such as yield function, hardening law and formability under different loading paths. In detail, a three dimensional representative volume element (RVE) is employed to represent the microstructure in the CP simulations, and the inhomogeneous nucleation and growth of deformed crystals are implemented into the PFM simulations. The results show that the coupled multiscale simulation can be a predictable tool for estimating the mechanical properties of metallic materials in the material design stage which commonly involves thermal, mechanical, and metallurgical processes.

Materials Chemistry and Engineering



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Kyushu University

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SNS: Facebook: [ken.albrecht.54](#)

Research Expertise

Organic Electronics, Polymer Chemistry, Materials Chemistry, Supramolecular Chemistry
Dendrimer, Carbazole, Organic Light-Emitting Diodes, Luminescent Materials

Academic Background

B. Sc. 2006 Department of Chemistry, Keio University (Japan)
M. Sc. 2008 School of Fundamental Science and Technology, Keio University (Japan)
Dr. Sc. 2010 School of Fundamental Science and Technology, Keio University (Japan)

Professional Appointments

Apr.2009~Sep.2010 Research Fellowship for Young Scientists (JSPS, DC2)
Oct.2010~July 2012 Specially Appointed Assistant Professor (Chemical Resources Laboratory, Tokyo Institute of Technology)
Aug.2012~Feb.2016 Assistant Professor (Chemical Resources Laboratory, Tokyo Institute of Technology)
Mar.2016~Dec.2018 Assistant Professor (Laboratory for Chemistry and Life Science, Tokyo Institute of Technology)
Apr.2016~Dec.2018 Group leader of JST-ERATO Yamamoto Atom-Hybrid Project (concurrently)
Oct.2018~ JST-PRESTO Researcher (concurrently)
Jan.2019~ Associate Professor (Institute for Materials Chemistry and Engineering, Kyushu University)

Selected Publications

1. K. Albrecht, K. Yamamoto, *J. Am. Chem. Soc.* **2009**, *131*, 2244.
2. K. Albrecht, K. Matsuoka, K. Fujita, K. Yamamoto, *Angew. Chem. Int. Ed.* **2015**, *54*, 5677.
3. K. Albrecht, Y. Hirabayashi, M. Otake, S. Mendori, Y. Tobar, Y. Azuma, Y. Majima, K. Yamamoto, *Sci. Adv.* **2016**, *2*, e1601414.
4. K. Albrecht, K. Matsuoka, D. Yokoyama, Y. Sakai, A. Nakayama, K. Fujita, K. Yamamoto, *Chem. Commun.* **2017**, *53*, 2439.
5. R. Yamada, K. Albrecht, T. Ohto, K. Minode, K. Yamamoto, H. Tada, *Nanoscale* **2018**, *10*, 19818.
6. K. Matsuoka, K. Albrecht, A. Nakayama, K. Yamamoto, K. Fujita, *ACS Appl. Mater. Interfaces* **2018**, *10*, 33343.
7. K. Iwai, H. Yamagishi, C. Herzberger, Y. Sato, H. Tsuji, K. Albrecht, K. Yamamoto, F. Sasaki, H. Sato, A. Asaithambi, A. Lorke, Y. Yamamoto, *Angew. Chem. Int. Ed.* **2020**, in press. DOI: 10.1002/anie.202000712
8. H. Yamagishi, S. Nakajima, J. Yoo, M. Okazaki, Y. Takeda, S. Minakata, K. Albrecht, K. Yamamoto, I. Badía-Domínguez, M. M. Oliva, M. C. R. Delgado, Y. Ikemoto, H. Sato, K. Imoto, K. Nakagawa, H. Tokoro, S. Ohkoshi Y. Yamamoto, *Commun. Chem.* In press. DOI: 10.1038/s42004-020-00364

Head-to-Tail Carbazole Derivatives as Photonic and Electronic Materials

Ken ALBRECHT

Abstract

Carbazole dendrimers and oligomers that consist of head-to-tail molecular structure shows unique electronic structure, i.e., intramolecular potential gradient which is favorable as photonic and electronic materials.

The development of emitting materials for OLEDs has started with fluorescence, moved to phosphorescence, and recently reached TADF. The important design principle of a TADF material is to spatially separate the HOMO and LUMO, because this reduces the difference in the singlet and triplet energy level. Carbazole dendrimers have the LUMO at the inner layer, and the HOMO at the outer-layer. Attachment of an acceptor can further separate the HOMO and LUMO and this molecule showed efficient TADF. These TADF dendrimers can be used as efficient solution-processable emitting-layer in OLEDs.

Since the proposition of single molecular electronics in 1970's, development of single molecule diode was a great target. Thus, several single molecule diodes have been reported. However, design of diode based on the pure orbital deformation mechanism was not yet achieved. I will demonstrate that head-to-tail carbazole oligomer is the first example of single molecule diode that operates based on this novel mechanism.

Materials Chemistry and Engineering



Min Sang KWON

Assistant Professor, Materials Science and Engineering,
Seoul National University

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Research Expertise

Organic/Polymer Chemistry, Photochemistry, Catalysis

Academic Background

- Ph.D. (2011) Chemistry, Seoul National University (Prof. Eun Lee)
- B.S. (2006) Chemistry, Seoul National University
- B.S. (2006) Materials Science and Engineering, Seoul National University

Professional Appointments

- 2020-Present Assistant Professor, Materials Science and Engineering, Seoul National University
- 2016-2020 Assistant Professor, Materials Science and Engineering, UNIST
- 2013-2016 Post-doctoral Fellow, University of Michigan (Prof. Jinsang Kim)
- 2011-2013 Post-doctoral Fellow, University of Michigan (Prof. Soo Young Park)

Selected Publications

1. Song, Y.†, Kim, Y.†, Noh, Y., Singh, V. K., Behera, S. K., Abudulimu, A., Chung, K., Wannemacher, R., Gierschner, J., Luer, L. & **Kwon, M. S.*** "Organic photocatalyst for ppm-level visible-light-driven reversible addition-fragmentation chain transfer (RAFT) polymerization with excellent oxygen tolerance" *Macromolecules*, 2019, 52, 5538–5545
2. Singh, V. K., Yu, C., Badgajar, S., Kim, Y., Kwon, Y., Kim, D., Lee, J., Akhter, T., Thangavel, G., Park, L. S., Lee, J., Nandajan, P. C., Wannemacher, R., Milian-Medina, B., Luer, L., Kim, K. S.*, Gierschner, J.* & **Kwon, M. S.*** "Highly efficient organic photocatalysts discovered via a computer-aided-design strategy for visible-light-driven atom transfer radical polymerization" *Nat. Catal.* 2018, 1, 794–804
3. Yu, J. C.†, Badgajar, S.†, Jung, E. D., Singh, V. K., Kim, D. W., Gierschner, J., Lee, E., Y. S. Kim, Cho, S., **Kwon, M. S.*** & Song, M. H.* "Highly efficient and stable inverted perovskite solar cells via semiconducting chemical additive treatment" *Adv. Mater.* 2018, 1805554

Visible-light Driven RAFT Polymerization

Min Sang KWON

Abstract

Photomediated-RAFT has recently received great attention due to its unique features such as oxygen tolerance, excellent monomer compatibility, and applicability to the synthesis of high molecular weight polymers. In this talk, I will summarize current development of photomediated-RAFT polymerization and also introduce our approaches for visible-light driven RAFT polymerizations.

Materials Chemistry and Engineering



Kenichi GOUSHI

Assistant Professor, Applied Chemistry, Kyushu University

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URL: <http://www.cstf.kyushu-u.ac.jp/~adachilab/>

Research Expertise

Organic electronics - Materials science and device physics

Academic Background

- 2006 Doctor of Science and technology in Chitose Institute of Science and Technology (CIST)
- 2002 B.S. in Chitose Institute of Science and Technology (CIST)

Professional Appointments

- 2010 Assistant Professor at Kyushu University, Department of Applied Chemistry
- 2009 Postdoctoral Fellow at Kyushu University, Center for Future Chemistry
- 2008 Assistant Professor at Tohoku University School of Engineering
- 2007 Postdoctoral researcher at National Institute of Information and Communication Technology
- 2006 JSPS postdoctoral research fellow

Selected Publications

1. B. S. B. Karunathilaka, U. Balijapalli, C. A. M. Senevirathne, Y. Esaki, K. Goushi, T. Matsushima, A. S. D. Sandanayaka, C. Adachi, "An organic laser dye having a small singlet-triplet energy gap makes the selection of a host material easier", *Adv. Funct. Mater.*, 30, 2001078, 2020.
2. R. Ieuji, K. Goushi, C. Adachi, "Triplet-triplet upconversion enhanced by spin-orbit coupling in organic light-emitting diodes", *Nat. Commun.*, 10, 5283, 2019.
3. A. S. D. Sandanayaka, T. Matsushima, F. Bencheikh, S. Terakawa, W. J. Potscavage Jr., C. Qin, T. Fujihara, K. Goushi, J.-Charles Ribierre, C. Adachi, "Indication of current-injection lasing from an organic semiconductor", *Applied Physics Express*, 12, 6, 061010, 2019.
4. H. Uoyama, K. Goushi, K. Shizu, H. Nomura, C. Adachi, "Highly efficient organic light-emitting diodes from delayed fluorescence", *Nature*, 492, 234 - 238, 2012.
5. K. Goushi, K. Yoshida, K. Sato, C. Adachi, "Organic light-emitting diodes employing efficient reverse intersystem crossing for triplet-to-singlet state conversion", *Nat. Photon.*, 6, 253 - 258, 2012.

Efficient organic photonic devices by manipulating triplet excited states

Kenichi GOUSHI

Abstract

Organic electronics have attracted significant attention as alternative and complementary technologies of inorganic semiconductors. Organic light-emitting diodes (OLEDs), which are one of the typical devices, have been widely used in practical applications such as high-resolution flexible displays and solid-state lighting with low-power consumption. Also, organic semiconductor laser diodes (OSLDs), which is recently demonstrated in our research group, would provide new applications due to the flexibility of color tuning based on the freedom of molecular design. To utilize efficient electroluminescence (EL) and stimulated emission in these devices, the engineering of molecular excited states is crucial important. The molecular excited states are classified into (spin-) singlet and triplet excited states. In electrical excitations, the triplet excited states are formed with the high probability, which is equivalent to three-quarters, and generally non-emissive excited states. The accumulation of triplet excited states often disturbs laser action. Therefore, triplet managements are key factor for improving the performances of organic photonic devices. In this presentation, I address our recent progress in the improving OLED and OS LD performances by triplet managements, respectively.

Materials Chemistry and Engineering



Jeong-Yun SUN

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Research Expertise

Multi-Functional Soft Materials

- Stretchable Ionics.
- Bio-inspired ionic brain and nerve system.
- Soft machines (actuators and sensors).
- Solid state ionic devices for bio-medical uses.
- Materials for tissue replacements and medical aids.

Academic Background

- 2007.3 ~ 2012.2 : Doctor of Philosophy in Materials Science and Engineering at Seoul National University in south Korea.
- 2005.3 ~ 2007.2 : Master of science in Materials Science and Engineering at Seoul National University in south Korea.
- 1998.3 ~ 2005.2 : Bachelor of science in Materials Science and Engineering at Seoul National University in south Korea.

Professional Appointments

- 2018.3 ~ Current : Associate Professor in Materials Science and Engineering at Seoul National University in south Korea.
- 2014.3 ~ 2018.2 : Assistant Professor in Materials Science and Engineering at Seoul National University in south Korea.
- 2013.5 ~ 2014.2 : Research Associate in Material Science and Mechanical Engineering at Harvard University in USA.
- 2012.1 ~ 2013.4 : Post Doctoral Fellow in School of Engineering and Applied Science at Harvard University in USA.

Selected Publications

1. "Ionic spiderwebs" *Science Robotics* (2020)
2. "Ion-to-Ion Amplification through an Open Junction Ionic Diode." *PNAS* (2019)
3. "Highly Stretchable, Transparent Ionic Touch Panel." *Science* (2016)
4. "Stretchable, Transparent Ionic Conductors." *Science* (2013).
5. "Highly stretchable and tough hydrogels." *Nature* (2012)

Ion-to-Ion Amplification through an Open Junction Ionic Diode

Jeong-Yun SUN

Abstract

As biological signals are mainly based on ion transport, the differences in signal carriers have become a major issue for the intimate communication between electrical devices and biological areas. In this respect, an ionic device which can directly interpret ionic signals from biological systems needs to be designed. Particularly, it is also required to amplify the ionic signals for the effective signal processing since the amount of ions acquired from biological systems is very small. In this study, we report on the signal amplification in ionic systems as well as sensing through the modified design of polyelectrolyte hydrogel based ionic diodes. By designing an open junction structure, ionic signals from the external environment can be directly transmitted to an ionic diode. Moreover, the minute ionic signals injected to the devices can also be amplified to a large amount of ions. The signal transduction mechanism of the ion-to-ion amplification is suggested and clearly verified by revealing the generation of breakdown ionic currents during an ion injection. Subsequently, various methods for enhancing the amplification are suggested.

Materials Chemistry and Engineering



Yu HOSHINO

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Research Expertise

Plastic antibodies, Controlled radical polymerization, CO₂ separation media, pK_a tuning of acids in polymers

Academic Background

Development of general procedures to create synthetic polymer nano materials, that function as antibody and enzymes, from inexpensive and stable acrylic monomers.

Professional Appointments

Japan Society of the Promotion of Science, JSPS Research Fellow (2005-2007)
University of California, Irvine, Postdoc (2006-2009)
University of California, Irvine, Project Scientist (2009-2010)
Kyushu University, Assistant Professor (2010-2013)
Kyushu University, Associate Professor (2013-)

Selected Publications

- 1) Y. Hoshino, T. Kodama, Y. Okahata, and K. J. Shea, *J. Am. Chem. Soc.*, 130, 15242-15243 (2008).
- 2) Z. Zeng, Y. Hoshino, A. Rodoriguez, H. Yoo, and K. J. Shea, *ACS nano*, 4(1), 199-204 (2010).
- 3) Y. Hoshino, H. Koide, T. Urakami, H. Kanazawa, T. Kodama, N. Oku, and K. J. Shea, *J. Am. Chem. Soc.*, 132, 6644-6645 (2010).
- 4) Y. Hoshino, W. W. Haberaecker III, T. Kodama, Z. Zeng, Y. Okahata, and K. J. Shea, *J. Am. Chem. Soc.*, 132, 13648-13650 (2010).
- 5) Y. Hoshino, et al., *Proc. Natl. Acad. Sci. USA*, 109, 33-38 (2012).
- 6) K. Yoshimatsu, B. K. Lesel, Y. Yonamine, J. M. Beierle, Y. Hoshino, and K. J. Shea, *Angew. Chem. Intl. Ed.*, 51, 2405-2408 (2012).
- 7) S.-H. Lee, Y. Hoshino, A. Randall, Z. Zeng, P. Baldi, R.-A Doong, and K. J. Shea, *J. Am. Chem. Soc.*, 134, 15765-15772 (2012).
- 8) Y. Hoshino, M. Nakamoto, Y. Miura, *J. Am. Chem. Soc.*, 134, 15209-15212 (2012).
- 9) Y. Hoshino, K. Imamura, M. Yue, G. Inoue, Y. Miura, *J. Am. Chem. Soc.*, 134, 18177-18180 (2012).
- 10) M. Yue, Y. Hoshino, Y. Ohshiro, K. Imamura, Y. Miura, *Angew. Chem. Intl. Ed.*, 126, 2692-2695 (2014).
- 11) K. Yoshimatsu, et al, *J. Am. Chem. Soc.*, 136, 1194-1197 (2014).
- 12) Y. Hoshino, R. C. Ohashi, Y. Miura, *Adv. Mater.*, 26, 3718-3723 (2014).
- 13) M. Yue, Y. Hoshino, Y. Miura, *Chem. Sci.*, 6, 6112-6123 (2015).
- 14) K. Yoshimatsu, H. Koide, Y. Hoshino, K. J. Shea, *Nature Protoc.*, 10, 595-604 (2015).
- 15) H. Lee, Y. Hoshino, Y. Wada, Y. Arata, A. Maruyama, Y. Miura, *J. Am. Chem. Soc.*, 137, 10878-10881 (2015).
- 16) M. Nakamoto, T. Nonaka, K. J. Shea, Y. Miura, Y. Hoshino, *J. Am. Chem. Soc.*, 138, 4282-4285 (2016).
- 17) H. Koide, K. et al, *Nat. Chem.*, 9, 715-722 (2017).
- 18) N. Nitta, et al. *Cell* 175, 266-276 (2018).
- 19) N. Nitta, et al. *Nature Comm.* 11, 1-16 (2020).
- 20) Y. Hoshino, et al. *J. Mater Chem. B.*, 8, 5597-5601 (2020).
- 21) Y. Hoshino, et al. *Angew. Chem. Intl. Ed.*, 59, 679-683 (2020).

Development of homogeneous plastic antibodies; well-defined polymer ligands that bind and neutralize toxicity of target peptide.

Yu HOSHINO

Abstract

Abiotic ligands that bind to specific biomolecules have attracted attention as substitutes for biomolecular ligands, such as antibodies and aptamers. Radical polymerization enables the production of robust polymeric ligands from inexpensive functional monomers. However, little has been reported about the production of monodispersed polymeric ligands. Herein, we present a route to create homogeneous ligands prepared via radical polymerization that recognize epitope sequences on a target peptide and neutralize the toxicity of the peptide. Taking advantage of controlled radical polymerization¹⁾, block-polymerization²⁾ and separation³⁾, a library of multifunctional oligomers with discrete numbers of functional groups was prepared⁴⁾. Affinity screening revealed that the sequence specificity of the oligomer ligands strongly depended on the number of functional groups⁴⁾. The process reported here will become a general step for the development of abiotic ligands that recognize specific peptide sequences.

- 1) H. Lee, Y. Hoshino, Y. Wada, Y. Arata, A. Maruyama, Y. Miura, *J. Am. Chem. Soc.*, 137, 10878-10881 (2015).
- 2) H. Takimoto, S. Katakami, Y. Miura, Y. Hoshino. *Mater. Adv.*, 1, 604-608 (2020).
- 3) Y. Hoshino, et al. *J. Mater Chem. B.*, 8, 5597-5601 (2020).
- 4) Y. Hoshino, et al. *Angew. Chem. Intl. Ed.*, 59, 679-683 (2020).

Materials Chemistry and Engineering



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SNS:

Research Expertise

- Bioresorbable, bioimplantable electronics for therapeutic treatment
- Unusual semi-conductor fabrication and materials processing
- Hydrolysis/corrosion mechanism in the biofluid and environmental fluid
- ▶ Materials and integration strategy for life-cycle/reliability control of devices

Academic Background

- ▶ Ph.D., Materials Science and Engineering, Seoul National University, Korea (2012)
- ▶ B.S., Materials Science and Engineering, Seoul National University, Korea (2006) (honor and early)

Professional Appointments

- ▶ **Assistant professor, Seoul National University**
 - Department of Materials Science and Engineering, Seoul National University, March 2019 to current
- ▶ **Assistant professor, KAIST**
 - Department of Bio and Brain Engineering, KAIST, June 2017 to February 2019
- ▶ **Postdoctoral fellowship**
 - Northwestern University, November 2016 to May 2017 (Advisor: John A. Rogers)
 - University of Illinois at Urbana-Champaign, October 2012 to November 2016
 - Seoul National University, March 2012 to September 2012 (Advisor: Dongil Kwon)

Selected Publications

- [1] S.-K. Kang et al., "Bioresorbable Silicon Electronic Sensors for the Intracranial Space and the Deep Brain", *Nature* 530, 71-76 (2016).
- [2] J. Koo et al., "Wireless bioresorbable electronic system enables sustained nonpharmacological neuroregenerative therapy", *Nature Medicine* 24(12), 1830 (2018)
- [3] S.-K. Kang et al., "Advanced Materials and Devices for Bioresorbable Electronics", *Account of Chemical Research* 51, 988-998 (2018).
- [4] H.L. Hernandez et al. "Triggered Transience of Metastable Poly(Phthalaldehyde) for Transient Electronics", *Advanced Materials* 26, 7637 (2014).
- [5] S.-K. Kang et al., "Dissolution behaviors and applications of silicon oxides and nitrides in transient electronics", *Advanced Functional Materials* 24, 4427 (2014).

Bioresorbable Electronics for Minimally Invasive Medical Sensing and Treatment of Nervous System

Seung-Kyun KANG

Abstract

Nanoscale thin-film technology has opened an era of soft, flexible and stretchable electronics and has also changed the timescale of dissolution of materials. Silicon nanomembranes of 10-100 nm thickness have dissolution behavior on the order of days to months. This feature lets us construct Si electronics for water-soluble and bioresorbable performance using unusual fabrication processes and combining soft/biodegradable polymers. Here we introduce two representative examples of bioresorbable Si electronic devices useful in monitoring and modulating the nervous system. First, a bioresorbable pressure sensor using piezoresistive Si strain gauge and 3D microstructured diaphragm was demonstrated to provide accurate measurement of intracranial pressure during the incubation period of traumatic injury. Wireless interfaces made of polymer-coated bioresorbable metal strips offer stable and continuous pressure monitoring. In-vivo functional and immunochemical demonstrations in a rat model suggests the potential validation of bioresorbable sensors in the clinical stage. In the other example, bioresorbable wireless electrical stimulator interfacing the peripheral nerve was demonstrated as a therapeutic modulator. An integrated circuit of Si diode, capacitor, and inductor with all-biodegradable metal, semiconductor and dielectric materials generate therapeutic electrical pulses by near-field inductive energy transfer. The accelerated functional recovery of transected nerve with electrical stimulation suggests the capability of bioresorbable stimulator to promote and/or modulate the nervous system in the treatment and rehabilitation stage.