

# Region 10 Section Report – Gwangju Section

## **PART A - SECTION SUMMARY**

### **A.1 Executive Summary – (Please follow the format given below)**

- Section Executive Committee Member List

CHAIR	Minjae Lee	<a href="mailto:minjae@gist.ac.kr">minjae@gist.ac.kr</a>
SECRETARY	Sung-Min Hong	<a href="mailto:smhong@gist.ac.kr">smhong@gist.ac.kr</a>
TREASURER	Jong Won Shin	<a href="mailto:jwshin@gist.ac.kr">jwshin@gist.ac.kr</a>
VICE CHAIR	Jong-In Song	<a href="mailto:jisong@gist.ac.kr">jisong@gist.ac.kr</a>
MEMBERSHIP DEVELOPMENT	Euseok Hwang	<a href="mailto:euseokh@gist.ac.kr">euseokh@gist.ac.kr</a>
MEMBER-AT-LARGE	Kiseon Kim	<a href="mailto:kskim@gist.ac.kr">kskim@gist.ac.kr</a>
	Heung-No Lee	<a href="mailto:heungno@gist.ac.kr">heungno@gist.ac.kr</a>
	Myoung Jin Lee	<a href="mailto:mjlee@chonnam.ac.kr">mjlee@chonnam.ac.kr</a>

- Section Highlights

In year 2021, the Section offered six technical (5) and administrative (1) meetings. Most technical activities were given at the campus of GIST, Korea or online.

- Major Events (International, National)

N/A

- Major Chapter Activities

N/A

- Major Student and Affinity Group Activities

In this year,

- Awards

N/A

### **A.2 Financial Report – (Please follow the format given below)**

- Summary

Date MM/DD/YYYY	Amount	Transaction Description	Task Number	Task Name	Expenditure/Revenue Type
2021-05-04	6210.61	OTHER REFERENCE: IA009989005513	3.95.000	000 Bank Account Transf	Income
2021-06-01	1.72	Interest Calculation: 5/1/2021 - 5/31/2021 @	3.40.000	000 IEEE CB Account Inte	Interest Income
2021-07-01	1.84	Interest Calculation: 6/1/2021 - 6/30/2021 @	3.40.000	000 IEEE CB Account Inte	Interest Income
2021-08-01	1.85	Interest Calculation: 7/1/2021 - 7/31/2021 @	3.40.000	000 IEEE CB Account Inte	Interest Income
2021-08-05	3070.10	Gwangju Section 2021 IEEE MGA SECTION RI	3.34.000	000 IEEE HQ & Societies	Section Rebate Reve
2021-09-01	2.50	Interest Calculation: 8/1/2021 - 8/31/2021 @	3.40.000	000 IEEE CB Account Inte	Interest Income
2021-09-21	-0.40	2641-M869088880-17-SEP-21--0.40-CROSS B	6.95.000	000 Bank Account Transf	Expense
2021-09-21	-39.50	2641-M869023682-17-SEP-21--39.50-POONG	4.10.010	010 Section Meeting	Expense
2021-10-01	2.45	Interest Calculation: 9/1/2021 - 9/30/2021 @	3.40.000	000 IEEE CB Account Inte	Interest Income
2021-10-18	-1.30	2641-M873708924-14-OCT-21--1.30-CROSS E	6.95.000	000 Bank Account Transf	Expense
2021-10-18	-130.23	2641-M873708925-14-OCT-21--130.23-BOOL	4.10.010	010 Section Meeting	Expense
2021-11-01	2.51	Interest Calculation: 10/1/2021 - 10/31/2021	3.40.000	000 IEEE CB Account Inte	Interest Income

Total amount transferred from the local bank account: 6210.61 USD

Total deposit in 2021 was 3070.10 USD

Total amount of interest incurred in 2021:  $1.72 + 1.84 + 1.85 + 2.50 + 2.45 + 2.51 = 12.87$  USD

- Any other financial activities

N/A

## **PART B - ORGANIZATIONAL ACTIVITIES**

### **B.1 Membership Development Activities**

- Total number of active members in the past 3 years.

In the last report, the number of active members was 250 for the Gwangju Section. (Checked by by the Membership Development officer, Prof. Euiseok Hwang)

As of November 30, 2021, we have 217 members in the Gwangju Section.

- Summary and evidence of work done to improve the value of membership, which leads to retention and growth of members

At the administrative meeting on October 14, 2021, the main agenda was the strategic discussion on increasing the number of IEEE student members. Especially, the newly-launched AI Convergence College project in the GIST was a good candidate for future collaboration. There are several young undergraduate students, who can be potential candidates for the IEEE student membership.

### **B.2 Chapter Activities**

- Total number of Chapters in the Section

N/A

- Number of Chapters formed in the current year

N/A

- Number of active Chapters (Chapters who have reported required number of meetings during the year)

N/A

- Summary of Chapter activities (Chapter wise with attachment table/information)

N/A

### **B.3 Professional and Continuing Education Activities**

In the year 2021, there have been 5 seminars supported by IEEE Gwangju Section.

- *Seminar #1*

**Date: January 22, 2021**

**Number of attendees: 21**

**Description: Seminar by Prof. Kuk-Jin Yoon, Korea Advanced Institute of Science and Technology, South Korea. The topic was View more widely and blurlessly: Computer vision with 360-degree cameras and event cameras.**

## **IEEE Gwangju Section Seminar**

**Host: Jong Won Shin / Language: Korean**

**Friday, January 22, 2021, 16:00~**

**Real-time lecture using ZOOM**

\* <https://zoom.us/j/97887938260?pwd=a2FDWG1KVmU5eXpiRjVPY0pFa21DQT09>

# ***View More Widely and Blurlessly: Computer Vision with 360- degree Cameras and Event Cameras***

**Kuk-Jin Yoon, Ph.D.**

Associate Professor

Dept. of Mechanical Engineering

Korea Advanced Institute of Science and Technology (KAIST)

### **[Abstract]**

In this talk, I introduce recent works to sense and perceive the environment with 360° and event cameras. First of all, event cameras have a lot of advantages over traditional cameras, such as, low latency, high temporal resolution, and high dynamic range. However, existing algorithms for conventional normal cameras could not be directly applied to event cameras due to the nature of event cameras. Therefore, it is demanding to generate intensity images from events for other tasks. In this talk, I demonstrate the potential of event cameras to generate high dynamic range (HDR) images and also non blurred images

under rapid motion. In addition, the possibility of generating very high frame rate videos and performing high-level tasks using events is demonstrated.

On the other hand, omni-directional cameras also have many advantages over conventional cameras. Several approaches have been recently proposed to apply convolutional neural networks (CNNs) to omni-directional images to solve classification and detection problems. However, most of them use image representations in the Euclidean space. This transformation leads to shape distortion due to nonuniform spatial resolving power and loss of continuity. In this talk, I introduce a novel method to apply CNNs to omni-directional images. The proposed method utilizes a spherical polyhedron to represent omni-directional views. The proposed approach can also be adopted by existing CNN-based methods. I demonstrate how the proposed method can be utilized for many computer vision tasks. In addition, I introduce some recent works based on 360° cameras such as 360° RGBD generation, 360° image semantic segmentation, and monocular depth estimation.

### **[Speaker Bio]**

Kuk-Jin Yoon received the B.S., M.S., and Ph.D. degrees in electrical engineering and computer science from the Korea Advanced Institute of Science and Technology in 1998, 2000, and 2006, respectively. He is now an Associate Professor at the Department of Mechanical Engineering, Korea Advanced Institute of Science and Technology, South Korea, leading the Visual Intelligence Laboratory. He is also affiliated with the KAIST Robotics Program, KAIST Division of Future Vehicle, KAIST Institute for Robotics, Cho Chun Shik Graduate School of Green Transportation, and Institute for Security Convergence Research at KAIST. Before joining KAIST, he was a Post-Doctoral Fellow in the PERCEPTION Team, INRIA, Grenoble, France, from 2006 to 2008, and was an Assistant/Associate Professor at the School of Electrical Engineering and Computer Science, Gwangju Institute of Science and Technology, South Korea, from 2008 to 2018. Also, he was a visiting scholar in Korea Institute of Science and Technology from 2013 to 2014 and was a technical advisor at the Visual Display Division, Samsung Electronics and also at the Mobility Team, Naverlabs, in 2017. He serves as an editor of International Journal of Automotive Technology and Sensors. His research interests include various topics in computer vision such as multi-view stereo, visual object tracking, SLAM and structure-from-motion, 360 camera and event-camera-base vision, sensor fusion.

- *Seminar #2*

**Date: March 18, 2021**

**Number of attendees: 44**

**Description: Seminar by Prof. Pascal Vrticka, University of Essex, UK. The topic was Social neuroscience – From first- to second-person paradigms.**

## **IEEE Gwangju Section Seminar**

**Host: Euseok Hwang / Language: English**  
**Thursday, March 18, 2021, 16:00~**

## **Watch recorded video using Zoom (followed by an online Q&A session)**

\* <https://zoom.us/j/9862801779?pwd=Z0w1eWlVZkkyc09Ha01IaW5pKy81U09>

(Meeting ID: 986 280 1779 / PW: eecs2021 )

## ***Social Neuroscience - From First- to Second-Person Paradigms***

**Pascal Vrticka, Ph.D.**

Assistant Professor

University of Essex (Colchester, UK)

### **[Abstract]**

Humans are social beings - from the cradle to the grave. We need social connections to stay physically and mentally healthy. Emerging through the combination of neuroscience and social psychology after 1992, social neuroscience aims at elucidating the neurobiological underpinnings of human social behaviour.

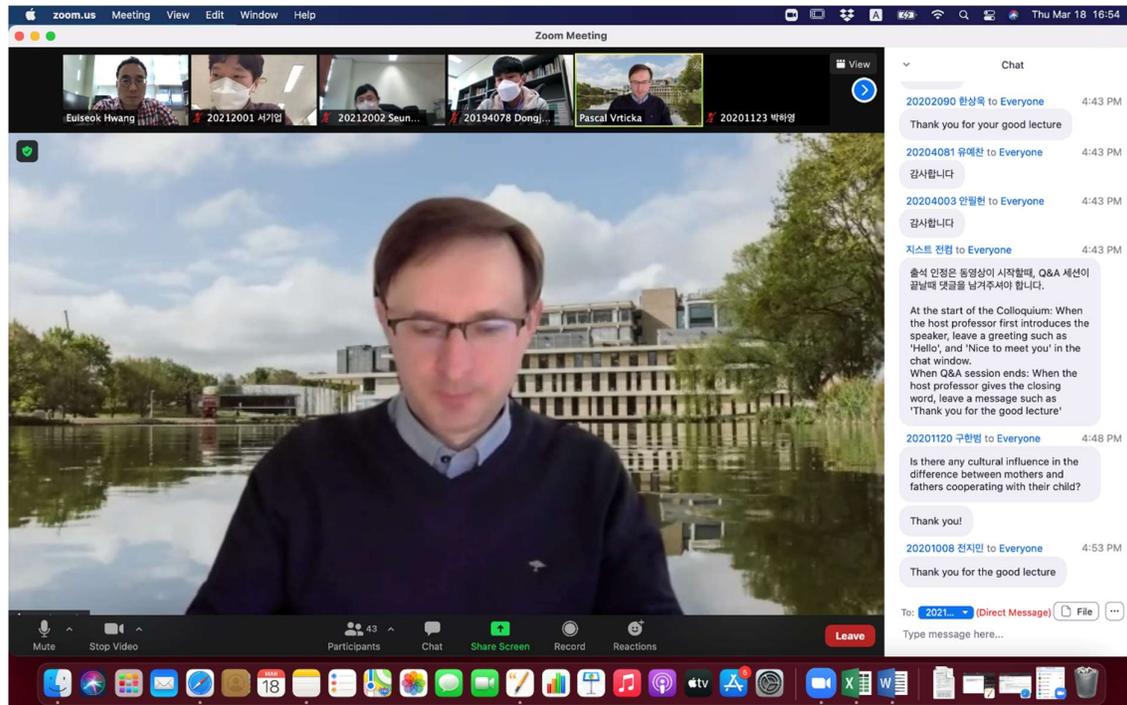
After a short introduction into the fundamental human social nature and social neuroscience as a relatively new field of research, this presentation will show what social neuroscience can reveal about brain functions underlying human social behaviour.

In doing so, a current transition from initial research in individual participants - nowadays called 1st person social neuroscience - to more recent studies assessing two (or more) participants during live social interaction - also called 2nd person social neuroscience - will be illustrated. For 2nd person social neuroscience, the main focus will be directed towards functional near-infrared spectroscopy (fNIRS) hyperscanning and the associated analysis method of Wavelet Transform Coherence (WTC) allowing for measuring interpersonal neural synchrony within the larger realm of bio-behavioural synchrony.

Finally, the obtained finding will be put into perspective with present and future demands to engineering, including virtual means of social communication and connection.

### **[Short Bio]**

Attachment



- Seminar #3

**Date:** April 29, 2021

**Description:** Seminar by Prof. Sejeong Kim, University of Melbourne, Australia.  
The topic was Materials for quantum photonics.

## IEEE Gwangju Section Seminar

Host: Young Min Song / Language: English  
**Thursday, April 29, 2021, 16:00~**  
**Real-time lecture using ZOOM**

\* <https://zoom.us/j/97742770023?pwd=TK1wNTRGN29WeDhzTkdnOUMvOWVaQT09>

(ID: 977 4277 0023, PW: 947726)

# Materials for Quantum Photonics

**Sejeong Kim, Ph.D.**  
 Lecturere  
 University of Melbourne

**Part 1. (Research talk)**

Recent work on hBN emitters and their photonic integration on photonic cavities and waveguides

**Part 2. (Non-research talk)**

My personal career path and share some struggles along the way

**[Speaker Bio]**

<https://findanexpert.unimelb.edu.au/profile/870415-sejeong-kim>

- *Seminar #4*

**Date:** September 17, 2021

**Number of attendees:** 13

**Description:** Seminar by Dr. Min-Seong Choo, Columbia University, USA. The topic was High-performance computing towards 4th Industrial revolution – How to break through “interface wall.”

Dr. Min-Seong Choo came to Gwangju for a seminar. The seminar was done through Zoom due to Covid-19 prevention. In this talk, the latest IC prototyping and designs were introduced including the numerous fabricated chip results. The discussion continues over the dinner.

## **IEEE Gwangju Section Seminar**

Host: Minjae Lee / Language: English

**Friday, September 17, 2021, 11:00~**

**Real-time lecture using Zoom**

\* <https://us06web.zoom.us/j/81864695547>

# ***High-Performance Computing Towards 4th Industrial Revolution - How to break through "Interface Wall"***

**Min-Seong Choo, Ph.D.**

Post-Doctoral Research Scientist  
Columbia University, New York, NY, USA

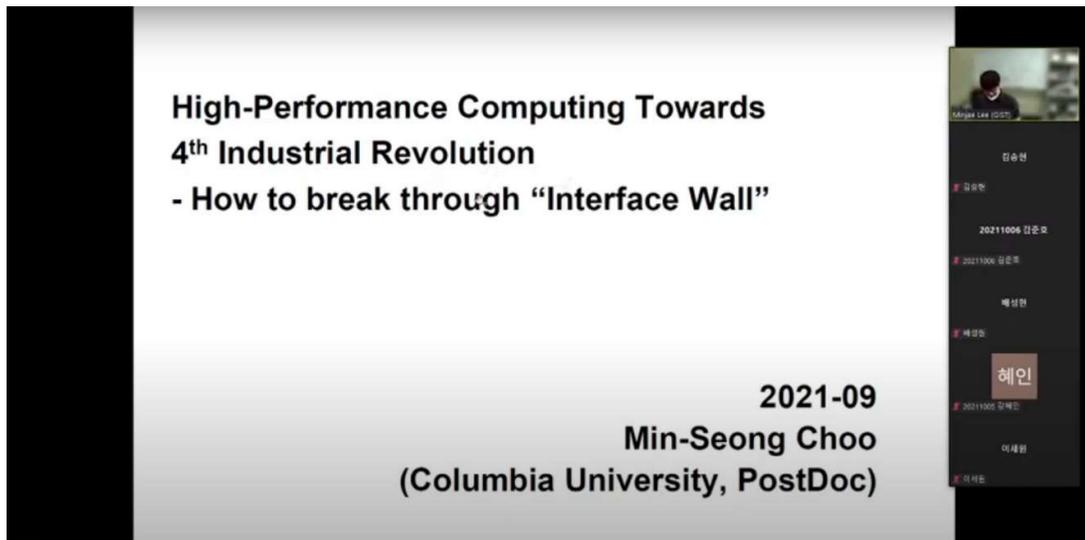
**[Abstract]**

In modern computing systems, high-speed interface circuits take a critical role in communication between various application-specific integrated circuits (ASICs). Entering the 4th industrial revolution, demands for data processes at once are overgrowing, so constraints requiring interface circuitry are also expanding. In order to mitigate these difficulties, various and novel schemes in circuits and systems have been reported, and these ideas have been actively adopted in real life and industrial application. Especially for the data center where the amount of the data process is enormous, interface circuitry is an essential component to accomplish the communication; optical communication or a new communication protocol has been proposed to meet the demands in the data process. In addition, the question mark of the existing computing system, Von-Neumann architecture, has been raised; thus, entirely new computing paradigms such as in-memory computing (IMC) or process-in memory computing (PIM) have been suggested. To catch up with the worldwide trend to accomplish the existing problems in IC communication, integrated circuit or system design, especially for the system semiconductor, has been a primary part. In this talk, in the aspect of the analog circuit designer, two different approaches to establish high-performance computing will be presented.

**[Speaker Bio]**

Min-Seong Choo (Member, IEEE) received the B.S. and Ph.D. degrees in electrical and computer engineering from Seoul National University, Seoul, South Korea, in 2012 and 2019, respectively. In 2019, he was a Post-Doctoral Researcher with the Inter-University Semiconductor Research Center, Seoul National University. From 2019 to 2020, he was a Research Scholar with the Center for Nanotechnology, NASA Ames Research Center, Moffet Field, CA, USA. He is currently a Post-Doctoral Research Scientist with Columbia University, New

York, NY, USA. His current research interests include phase-locked loops (PLLs), clock and data recovery (CDR) circuits, injection-locked oscillators (ILOs), memory system architecture, and neuromorphic computing. Dr. Choo has served as a Reviewer for various journals, including the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS—I: REGULAR PAPERS, the IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS—II: EXPRESS BRIEFS, and IEEE ACCESS.



- Seminar #5

**Date: October 1, 2021**

**Description: Seminar by Prof. Yong-Su Na, Seoul National University, South Korea. The topic was Status and prospect of nuclear fusion based on tokamak concept.**

# IEEE Gwangju Section Seminar

Host: Euseok Hwang / Language: English

**Friday, October 1, 2021, 14:30~**

**Real-time lecture using Zoom**

\* <https://zoom.us/j/9862801779?pwd=Z0w1eWlVZkkyc09Ha01IaW5pKy81UT09>

(Meeting ID: 986 280 1779 / PW: eecs2021)

## ***Status and Prospect of Nuclear Fusion Based on Tokamak Concept***

**Yong-Su Na, Ph.D.**

Professor

Dept. of Nuclear Engineering  
Seoul National University

### **[Abstract]**

Nuclear fusion is a promising technology for replacing carbon-dependent energy sources. This talk covers the basic principle of nuclear fusion and its commercial usage for energy production based on the tokamak concept. Overview of fusion power plants, composed of fusion reactor system, heat transfer & fuel cycle system, and power conversion system will be given. Critical issues and current status of nuclear fusion development are addressed including International Thermonuclear Experimental Reactor (ITER).

### **[Short Bio]**

Attachment

### **B.4 Students Activities**

- Total number of Student Branches in the Section

N/A

- Number of Student Branches formed in the current year

N/A

- Section level student activities (student congress, paper and other contests, awards etc)

N/A

- Number of active Student Branches (Student Branches who have reported required number of meetings during the year)

N/A

- Summary of Student Branch activities (Student Branch wise with attachment table/information)

N/A

### **B.5 Affinity Group Activities**

- Young Professional (YP)

N/A

- Women In Engineering (WIE)

N/A

- Life Member (LM)

N/A

### **B.6 Awards & Recognition Activities**

- Award constituted by the Section

N/A

### **B.7 Communication Activities (Newsletter, Home Page, E-mail etc.)**

- Newsletter (name and number of issues in the year)

N/A

- Home Page of the Section (give the URL and how often it is updated)

In the year 2021, the Gwangju Section launched its home page. You can find it at:  
<https://sites.google.com/view/ieee-gwangju/seminar>  
 The home page is updated based upon the event (for example, a technical seminar).

- Other means of contacts with Section members including social media

N/A

### **B.8 Industry Relations**

- Membership growth and retention

N/A

- Activities for/with industrial members

N/A

## **B.9 Humanitarian Technology Activities**

- Humanitarian Technology related activities supported by the Section including collaboration with other OUs.

N/A

- SIGHT Activities

N/A

## **B.10 Community Activities**

- IEEE Social activities (Family day, IEEE day, Engineers Week)”

N/A

## **PART C - OTHERS**

### **C.1 Special Events**

- Please briefly describe the importance of special events and the outcomes achieved

N/A

- Funding secured from the IEEE and external sources including sponsorships

N/A

### **C.2 Relationship with National and International Societies and Non-Government Organizations (NGO)**

- Nature of relationship and details of any formal agreement signed

N/A

- Details of joint activities

N/A

- Benefit to IEEE members (for example discounts, access to technical information etc.)

N/A

- Benefit to Section (for example help in membership development, venue facilities, cost saving etc.)

N/A

### **C3. Collaboration with other IEEE Sections**

- Support extended to neighboring Sections

N/A

- Joint activities with any other Section

N/A

#### **C.4 Support extended to Sub-sections & Society Chapters within the Section**

- Support extended for organising technical, educational and professional activities

N/A

- Joint activities for membership development

N/A

- Support extended for the formation of a Sub-section or transition of a Sub-section into a full Section

N/A

#### **C.5 Best Practices of your Section (which you would like to share with other Sections for the benefits of members)**

#### **C.6 Problems anticipated and suggestions for solutions, if any**

### **PART D - GOALS AND PLANS**

#### **D.1 Continuation of project/activity in progress and their implementation plans**

#### **D.2 Goals and Future Plans**

It is not still unclear whether we, in South Korea, can organize any social event without restriction or not in 2022. Therefore, our present plan is to organize several high-quality technical seminars, which can be made on-line. For that purpose, the incentive can be spent as the honorarium. Another activity which can be made on-line is the partial reimbursement of the student membership fee. The incentive will be very helpful for maintaining (and even increasing) the number of our student members.

#### **D.3 Any innovative ideas to make IEEE more creative and value added for sustaining the membership retention and recruitment goals.**

#### **D.4 Business Plan for Sustainable Growth and Financial Stability.**