

Byungdo Park

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RESEARCH INTERESTS	Differential geometry and algebraic topology. Secondary characteristic classes, geometric structures on higher bundles, generalized cohomology theories and their equivariant, differential, and twisted refinements, higher categories and sheaves, index theory, noncommutative geometry, and topology of matters.	
ACADEMIC APPOINTMENTS	Chungbuk National University , Cheongju, Korea Associate Professor at the Department of Mathematics Education	September 2023 – Present
	Chungbuk National University , Cheongju, Korea Assistant Professor at the Department of Mathematics Education	September 2019 – August 2023
	Korea Institute for Advanced Study (KIAS) , Seoul, Korea Research Fellow (Postdoc) at School of Mathematics	October 2017 – August 2019
	The City University of New York (CUNY) , New York NY, USA Adjunct Assistant Professor (Hunter College and the Bronx Community College) of Mathematics	January 2017 – May 2017
	Max Planck Institute for Mathematics , Bonn, Germany Postdoctoral Fellow	October 2016 – December 2016
VISITING POSITIONS	The Hebrew University of Jerusalem , Jerusalem, Israel Host: Zachary McGuirk	February 2020
	Hausdorff Research Institute for Mathematics , Bonn, Germany Guest (Postdoc) Trimester program “K-Theory and Related Fields”	May 2017 – August 2017
	Hausdorff Research Institute for Mathematics , Bonn, Germany Guest (PhD Student) Trimester program “Homotopy theory, manifolds, and field theories”	August 2015
ADMINISTRATIVE POSITIONS	Chungbuk National University , Cheongju, Korea Director of the Office of Educational Innovation Oversees University’s Educational Innovation Center, leading comprehensive Total Quality Management (TQM) systems and evidence-based policy development for all academic programs. Directs institutional research (IR), faculty development initiatives, and smart education programs to enhance university-wide educational quality and competitiveness. (Dual mandate) Chairperson of the Department of Art and Design Oversees the Department of Fine Arts and the Department of Design (Dual mandate) Director of the Chungcheong Higher Education Compact (CHEC) Leads collaborative educational innovation initiatives across 8 national universities in Chungcheong region, facilitating inter-university credit exchange programs and joint academic development projects. Supervises multi-institutional partnerships encompassing 50,000+ students, driving regional higher education integration and coordinating strategic educational reforms across diverse academic institutions.	August 2025 – August 2027
	Chungbuk National University , Cheongju, Korea Associate Dean of the College of Education (Dual mandate) Director of the Teacher Appointment Support Center (Dual mandate) Director of the Future Education Center Oversees academic, research, student, planning, admission affairs of the College of Education	March 2024 – August 2024
EDUCATION	CUNY Graduate Center , New York NY, USA Doctor of Philosophy in Mathematics Thesis title: A geometric model of twisted differential K -theory Advisor: Mahmoud Zeinalian	August 2010 – September 2016

CUNY Graduate Center, New York NY, USA
Master of Philosophy in Mathematics
Advancement to candidacy.

February 2015

Yonsei University, Seoul, Korea
Bachelor of Science in Mathematics
Senior Thesis: Notes on L-Infinity algebras
Advisor: Jae-Suk Park
Member of honor program in sciences
On Leave from October 2002 to February 2006 for a mandatory military service.

March 2001 – February 2009

- PUBLICATIONS** **On the smoothness of the geodesic spray for the Camassa-Holm equation**, with Jae Min Lee, *J. Math. Anal. Appl.*, **516**(1) (2022) 126472 1–12.
Noncommutative differential K -theory, with Arthur Parzygnat, Corbett Redden, and Augusto Stoffel, *J. Geom. Phys.*, **174** (2022) 104446 1–40. arXiv:2106.12073.
A note on Venice lemma in differential K -theory, *Arch. Math.*, **118**(2) (2022) 215–224.
A classification of equivariant gerbe connections with Corbett Redden, *Commun. Contemp. Math.*, **21**(2) (2019) 1850001 1–40. arXiv:1709.06003.
Geometric models of twisted differential K -theory I, *J. Homotopy and Relat. Struct.*, **13**(1) (2018) 143–167. arXiv:1602.02292
A smooth variant of Hopkins-Singer differential K -theory, *New York J. Math.*, **23** (2017) 655–670. arXiv:1607.08686
- PREPRINTS** **Brown functors of directed graphs**, with Hsuan-Yi Liao, Dang Khoa Nguyen, and Zachary McGuirk, (2025) arXiv:2503.14865.
Generalizations of the Thistlethwaite–Tsvietkova method, with Alice Kwon and Ying Hong Tham, (2023) arXiv:2309.01282.
Geometric families define differential K -theory, with Jae Min Lee, (2024).
- REPORT** **Self-Evaluation Report of the Department of Mathematics Education for the Self-Certified Major Education System of Chungbuk National University** (in Korean)
Principal Investigator.
Certified for 4 years (1 March 2025 to 28 February 2030)
Document: College of Education-14664 (2024.12.19.), Office of Education Innovation-1302 (2025.02.26.)
- WORK IN PROGRESS** **Cycle maps in twisted differential K -theory**, with Daniel Grady
Equivariant arithmetic Chow groups and equivariant differential cohomology, with Sreedhar Bhamidi
Equivariant eta forms in local index theory, with Jae Min Lee.
The Euler–Arnold theory via algebraic topology: Sullivan’s methodology, with Jae Min Lee.
Geometric models of twisted differential K -theory II: Non-torsion case, first draft available.
Twisted Atiyah–Jänich theorem, first draft available.
- POLICY RESEARCH IN PROGRESS** **A study on cycles required by the 6th teacher training institution competency assessment and the role of the college administration** (in Korean)
Document: College of Education-9505(2024.8.30.)
- BOOKS** **Calculus** (in Korean), **Precalculus** (in Korean) and **College Mathematics** (in Korean), with Daewoong Cheong, Sukjung Hwang, Un Cig Ji, Sangdon Jin, Sejong Kim, Sun Kwang Kim, Doowon Koh, Ohsang Kwon, Eunjeong Lee, Jaemin Shin, Changhun Yang, Mee Sue Yoo, Youngho Yoon, *Kyungmoon Publishing Co.*
ISBN-13: 9791160736908 (Calculus) Available to purchase at Kyobo, Aladin.
ISBN-13: 9791160736915 (Precalculus) Available to purchase at Kyobo, Aladin.
ISBN-13: 9791160736922 (College Mathematics) Available to purchase at Kyobo, Aladin.
Knowledge and education in the era of new media (in Korean), with Jin Choi, Seung-Hyun Choi, Hye-Jee Gil, Yeungyu Ha, Jiyoung Hwang, Gail Jeon, Jieun Lim, Sein Shin, Kyung Chan Son, Kyungwon Son, Jooho Song, and Hyun Wi Yoon, *Pakyoungsa*, (2022) ISBN-13: 9791165192730
Contributed a chapter “How can we be good at mathematics?”
Available to purchase at Kyobo, Aladin.

BOOK PROJECTS IN PROGRESS	Gelfand's Geometry (in Korean) <i>Kyungmoon Publishing Co.</i> Korean translation of the monograph <i>Geometry</i> by Israel M. Gelfand and Tatiana Alekseyevskaya (Gelfand), <i>Birkhäuser</i> , (2020) ISBN-13: 9781071602997	
SELECTED PRESENTATIONS	KIAS Geometry and Topology Group Seminar Korea Institute for Advanced Study (KIAS), Seoul, Korea <i>Differential cohomology and gerbes: An introduction to higher differential geometry</i> Host: Seokbong Seol	November 2024
	Algebraic Structures in Geometry and Physics: a conference on the occasion of Jae-Suk Park's 60th birthday Uni Hotel Jeju, Jeju, Korea <i>Aspects of differential K-theory</i> Host: Cheol-Hyun Cho and Hwajong Yoo	November 2024
	IUT Mathematics and Statistics Research Seminar (online) Isfahan University of Technology, Isfahan, Iran <i>Differential Cohomology and Gerbes: An Introduction to Higher Differential Geometry</i> (3 lectures) Host: Sajjad Lakzian	December 2023
	Mathematics Department Colloquium Pusan National University, Busan, Korea <i>An introduction to differential K-theory</i> Host: Donghoon Jang	May 2022
	Three W's Seminar (online) Korea Institute for Advanced Study (KIAS), Seoul, Korea <i>The Atiyah-Jänich theorem and its twisted refinement</i> Host: Sreedhar Bhamidi	December 2020
	Mathematics Department Colloquium (online) Chungbuk National University, Cheongju, Korea <i>The Atiyah-Jänich theorem and its twisted refinement</i> Host: Sejong Kim	November 2020
	KIAS Topology Seminar Korea Institute for Advanced Study (KIAS), Seoul, Korea <i>Twisted differential K-theory, geometric models, and sheaves of spectra</i> Host: Hsuan-Yi Liao	December 2019
	DG Seminar Korea Institute for Advanced Study (KIAS), Seoul, Korea <i>What is an ∞-category? (1), (2), (3)</i> Host: Bumsig Kim	February 2019
	2018 Seoul – Tokyo Conference in Mathematics Korea Institute for Advanced Study (KIAS), Seoul, Korea <i>Cycle maps in differential K-theory</i> Host: Jinsung Park	December 2018
	Topology in Australia and South Korea 2018 IBS Center for Geometry and Physics (IBS-CGP), Pohang, Korea <i>A classification of equivariant gerbe connections</i> Host: Gabriel C. Drummond-Cole	April 2018
	The 13th KIAS Winter School on Differential Geometry Korea Institute for Advanced Study (KIAS), Seoul, Korea <i>Introduction to differential cohomology</i> (3 lectures) Host: Insong Choe and Jaigyoung Choe Conference venue: Hill Condominium, High 1 Resort, Jeongseon, Korea	January 2018 – February 2018

Higher Categories and Mirror Symmetry

Korea Institute for Advanced Study (KIAS), Seoul, Korea

December 2017

A classification of equivariant gerbe connections

Host: Bumsig Kim and Gregory Ginot

Topology Workshop – Cohomology Theories, Categories, and Applications

University of Pittsburgh, Pittsburgh, PA USA

March 2017

A geometric model of twisted differential K-theory

Host: Hisham Sati

Research Seminar

The Bronx Community College, CUNY, Bronx NY USA

February 2017

Aspects of equivariant gerbes with connection

Host: Cormac O’Sullivan

Algebraic Topology Seminar

Princeton University, Princeton NJ USA

February 2017

A geometric model of twisted differential K-theory

Host: Tony Bahri and Martin Bendersky

K-theory Seminar

Hausdorff Research Institute for Mathematics, Bonn, Germany

November 2016

Models of differential K-theory and comparison problems

Host: Kristian Jonsson Moi

Higher Differential Geometry Seminar

Max Planck Institute for Mathematics, Bonn, Germany

November 2016

A geometric model of twisted differential K-theory

Host: Christian Blohmann

Geometry and Physics (GAP) Seminar

Pennsylvania State University, University Park, PA USA

September 2016

A geometric model of twisted differential K-theory

Host: Ping Xu and Mathieu Stiénon

GAP XIV: Geometry and Physics “Séminaire itinérant” — Graded geometry and applications to physics

University of Sheffield, Sheffield, UK

August 2016

A geometric model of twisted differential K-theory

Poster presentation

Deformation Theory Seminar

University of Pennsylvania, Philadelphia PA USA

June 2016

A geometric model of twisted differential K-theory

Host: James Stasheff

2016 Lehigh University Geometry and Topology Conference

Lehigh University, Bethlehem PA USA

May 2016

*A geometric model of twisted differential K-theory***GRANTS****National University Development Project – International Collaborative Research Support**

Chungbuk National University

October 2024–February 2025

Project title: Construction of a Brown functor on finite directed graphs using directed graph path cohomology

Principal Investigator. Amount KRW 15,000,000 (equivalent to \$13,333)

Documents: Research Promotion Division-7193 (2024.10.22.)

Basic Research Program in Science and Engineering

The National Research Foundation of Korea (NRF)

March 2020–August 2023

The Ministry of Science and ICT, Republic of Korea

Project title: A study on differential cocycles via higher sheaves on manifolds

Principal Investigator. Amount KRW 90,000,000 (equivalent to \$80,000)

Grant No. 2020R1G1A1A01008746

National University Development Project – Creativity of next-generation researchers

Chungbuk National University

May 2022–December 2022

Project title: An approach on Euler-Arnold equations via algebraic topology: Sullivan's methodology

Principal Investigator. Amount KRW 9,000,000 (equivalent to \$8,000)

Documents: Research Support Division-3768 (2022.05.11.)

Research Grant for New Faculty

Chungbuk National University

September 2019–August 2020

Project title: Geometry and topology of directed graphs

Principal Investigator. Amount KRW 17,000,000 (equivalent to \$15,111)

Documents: Research Foundation-11099 (2019.08.28.)

Development of New Leading Scientists**KIAS School of Mathematics Group Seminar**

Korea Institute for Advanced Study

January 2019–August 2019

The Ministry of Science and ICT, Republic of Korea

Project title: KIAS Topology Seminar

Co-organizer. Annual grant KRW 7,500,000 (equivalent to \$6,667)

Project title: Three W's Seminar

Co-organizer. Annual grant KRW 7,500,000 (equivalent to \$6,667)

Development of New Leading Scientists

Korea Institute for Advanced Study

October 2017–August 2019

The Ministry of Science and ICT, Republic of Korea

Project title: Differential cocycles in algebraic topology and their applications

Principal Investigator. Amount KRW 25,917,000 (equivalent to \$23,037)

Doctoral Student Research Grant

CUNY Graduate Center

June 2015–May 2016

Project title: Twisted differential K -theory, infinity categories, and mathematical physics

Principal Investigator. Amount \$1,000

CUNY Doctoral Students' Council Grant

Fall 2015

A grant for organizing seminars and conferences

Project title: The Homotopy Theory Learning Group

Principal Investigator. Amount \$700

CUNY Doctoral Students' Council Grant

Fall 2014

A grant for organizing seminars and conferences

Project title: The Algebraic Topology Student Seminar

Principal Investigator. Amount \$600

SERVICE**Scholarly Service**

Referee for Journal of Geometry and Physics

Referee for Journal of the Korean Mathematical Society

Reviewer for Mathematical Reviews

June 2018 – Present

Reviewer for Zentralblatt Math

March 2016 – Present

Editor of Newsletter of the Korean Mathematical Society

January 2023–December 2024

Reviewer for the National Research Foundation (NRF) of Republic of Korea

2024, 2023

External reviewer for tenure-track faculty hiring process

June 2020 – Present

7 national universities and 10 private universities in Korea (counted with multiplicity).

External interviewer for tenure-track faculty hiring process

December 2023, January 2021

2 national universities in Korea.

PhD thesis reader (Committee vice chair) for 1 PhD in Mathematics Education

Organizer for Geometry Seminar at CBNU Mathematics Education dept.

October 2020–Present

Organizer for Topology Seminar at KIAS

January 2018–August 2019

Organizer for the three W's Seminar at KIAS

January 2019–August 2019

Postdocs' seminar addressing Was, Warum, Wie (what, why, and how in German) on each research topic.

Organizer for the Homotopy Theory Learning Group at CUNY

Fall 2015

Organizer for the Algebraic Topology Student Seminar at CUNY

Fall 2014

University Service (at Chungbuk National University)

Ex officio positions (of the Director of Office of Educational Innovation)

September 2025 – August 2027

Member of the Academic Board

Member of the Educational Innovation Committee

Member of the Performance Management Committee Steering committee member of the Office of Liberal Arts Education

Reviewer for the Executive Committee for the 6th Governmental Assessment for Teacher-training institutions
September 2024 – August 2025

Ex officio positions (of the Associate Dean of the College of Education)

March 2024 – August 2024

Member of the Planning Committee

Member of the Research Environment Committee

Member of the Admission Management Committee

Member of the Admission Management Committee for International Students

Member of the Teacher Training Committee

Member of the Undergraduate Common Curriculum Committee

Member of the Committee for Laboratory Safety Management

Member of the Committee for Energy Conservation

Member of the Curriculum committee of the College of Education

Steering committee member of the Graduate School of Education

Steering committee member of the Teacher Training Division

Steering committee member of the Education Center for Gifted-Students in Sciences

Division Head of the Administrative Support Team of the Executive Committee for the 6th Governmental Assessment for Teacher-training institutions

Associate Head of the Task-Force Committee for the University Support Project for Improving Teacher Training Programs (MOE project)

Representative of Faculty Assembly

September 2022 – August 2024

Legislation subcommittee – statute, regulations, and human resources affairs

Member of the Institutional Assessment Research Committee

March 2024 – October 2024

Steering committee member of the Education Research Institute

December 2019 – Present

Internal admission officer

2023, 2022, 2021

Member of the Curriculum committee of the College of Education

May 2020 – May 2022

Member of the Task-Force Committee for Future Education Center construction and pilot operation project
August 2020 – February 2021

Departmental Service (at Chungbuk National University)

Member of the departmental scholarship committee

August 2020 – February 2024

Member of the curriculum committee

March 2020 – August 2023

Member of the tenure-track faculty search committee

Fall 2023, Fall 2022, Fall 2021

Member of the department officer hiring committee

Feb. 2021, Feb. 2022

Interviewer and question designer for undergraduate admission

Fall 2019 – Present

Transfer admissions (interviewer 4 times / question designer 3 times), internal transfers (interviewer 1 time / question designer 1 time), personality and aptitude interviewer (4 times).

Interviewer and question designer for graduate admission

Spring 2023 – Present

The Graduate School of Education – (interviewer 2 time / question designer 4 times).

Outreach and Community Service

Invited speaker for a public lecture for high school students in Chungbuk Province

3 high school on-site, 5 high schools on-campus

July 2024– December 2024

2 high schools on-site, 9 high schools via online

July 2023– December 2023

8 high schools on-site, 17 high schools via online (also in Sejong City)

May 2022 – August 2022

5 high Schools

December 2021

1 high School

July 2020

Advisory panel for an expansion plan of Chungbuk Mathematics Experience Center, Chungbuk

Natural Sciences Education Center

November 2019 – December 2019

SUPERVISION EXPERIENCES

A study on differential cocycles via higher sheaves on manifolds (2 students)

May 2020 – June 2021

Mentoring a undergraduate student for reading Atiyah, Bott, and Shapiro, *Clifford Modules* and a Master's student for Freed and Hopkins *Chern-Weil forms and abstract homotopy theory*.

Geometry and topology of directed graphs (2 students)

September 2019 – February 2020

Mentored undergraduate students for learning algebraic tools for research, providing support for participating conferences, and teaching \LaTeX .

Characteristic Classes Learning Group (2 students)

May 2013 – February 2014

Lecturing and mentoring in a learning group of Milnor and Stasheff's Characteristic Classes.

TEACHING EXPERIENCES

At Chungbuk National University

Advanced Topics in History of Mathematics and Mathematics Education (graduate course)

Foundation of Mathematics II (graduate course)

Foundation of Mathematics I (graduate course)

Topics in Geometry I (4 semesters; graduate course)

Special Research Project II (graduate course)

Special Research Project I (graduate course)

Geometry and Education (Undergraduate topics course on teaching geometry, 2 semesters)

Differential Geometry II (6 semesters)

Differential Geometry I (6 semesters; incl. Spring 2025)

General Topology I

Complex Analysis II

Complex Analysis I

Geometry for Teachers II (2 semesters. Introduction to Euclidean, non-Euclidean, and projective geometries)

Geometry for Teachers I (6 semesters; incl. Spring 2025. Conics and the classification theorem)

Introduction to geometry (2 semesters; incl. Spring 2025)

Calculus II (2 semesters)

Calculus I (3 semesters; incl. Spring 2025)

At the City University of New York

Vector Analysis (Multivariable calculus and differential forms)

Calculus III (Multivariable calculus)

Calculus II (Integral calculus, 2 semesters)

Calculus II Lab (MAPLE simulation)

Calculus I (Differential calculus, 3 semesters)

Calculus I Lab (MAPLE simulation)

Precalculus

Trigonometry and College Algebra (Community College teaching experience)

College Algebra

Tasks Involved: Lecturing, grading, and writing and administering exams.

TEACHING AWARDS

Faculty Teaching Excellence, Chungbuk National University

4 semesters: Fall 2024, Spring 2024, Fall 2021, Fall 2020, Fall 2019

ACADEMIC HONORS & AWARDS

Dissertation Year Fellowship, CUNY Graduate Center

Fall 2015 – Spring 2016

Quantitative Reasoning Fellowship, CUNY Graduate Center

Fall 2014 – Spring 2015

Graduate Teaching Fellowship, CUNY Graduate Center

Fall 2012 – Spring 2014

University Fellowship, CUNY Graduate Center

Fall 2013 – Spring 2014

Science Fellowship, CUNY Graduate Center

Fall 2010 – Spring 2012

Yonsei Special Awards, Yonsei University

Spring 2006, Fall 2006, Fall 2007, and Spring 2008

Highest Honors Student, High Honors Student, Honors Student, Yonsei University

Fall 2001, Spring 2001, and Fall 2007

University Designated Scholarship, Yonsei University

Fall 2002

	The Kwanjeong Scholarship, Kwanjeong Educational Foundation	April 2002
SELECTED TRAVEL SUPPORT RECEIVED	<p>Workshop on gauge theory and Floer homology Peking University, Beijing, China. Full accommodation support.</p> <p>International Workshop on Algebraic Topology Southern University of Science and Technology, Shenzhen, China. Travel award \$ 500 and full accommodation support.</p> <p>Summer School “Coarse Index Theory” Albert-Ludwigs-Universität Freiburg, Freiburg, Germany. Travel and accomodation award €1,580.</p> <p>GAP XIV: Geometry and Physics “Séminaire itinérant” — Graded geometry and applications to physics University of Sheffield, Sheffield, UK Travel and accommodation award \$1,380.</p> <p>Topology of Manifolds: A conference in honour of Machael Weiss’ 60th birthday University of Lisbon, Lisbon, Portugal. Travel and accommodation award \$2,340.</p> <p>GAP XIII: Geometry and Physics “Séminaire itinérant” — Derived geometry IBS Center for Geometry and Physics, Pohang, South Korea. Travel award \$1,600 and full accommodation support.</p>	<p>December 2019</p> <p>June 2018</p> <p>September 2016</p> <p>August 2016</p> <p>June 2016</p> <p>July 2015</p>
LANGUAGES	<p>Languages English: Fluent. Korean: Native. French and German: Basic proficiency. Proficiency in Computer Languages C/C++, MATLAB, FORTRAN, MAPLE LaTeX</p>	
SELECTED OFFERS	<p>Korea Institute for Advanced Study (KIAS), Seoul, Korea Research Fellow (Postdoc) in School of Mathematics 2-year extension of the contract (October 2019 – September 2021 – Resigned as of August 31, 2019).</p> <p>Eduard Čech Institute for Algebra, Geometry and Physics, Prague, The Czech Republic 16-month postdoctoral position (Offer declined) In the research group of Branislav Jurčo and Martin Markl</p>	<p>March 2019</p> <p>April 2017</p>
DATE	Last updated: 1 August 2025.	