EWHA WOMANS UNIVERSITY

INSTITUTE FOR MULTISCALE MATTER AND SYSTEMS

Ewha Womans University · Institute for Multiscale Matter and Systems

Postdoctoral Researcher · Research Professor Integrated Recruitment Announcement

4 Core Projects | CP1 · CP2 · CP3 · CP4

JUNE 2026

52 Ewhayeodae-gil, Seodaemun-gu, Seoul, Republic of Korea

1 About the Institute

■ IMMS — Institute for Multiscale Matter and Systems

Ewha Womans University IMMS (Institute for Multiscale Matter and Systems) is a leading convergence research institute of the Republic of Korea, selected in 2025 for the National Research Laboratory (NRL 2.0) program of the Ministry of Science and ICT and the Ministry of Education. Backed by a stable ten-year funding commitment of approximately KRW 120 billion, IMMS pursues integrated, full-cycle innovation spanning from the atomic and molecular scale up to the material and system level, with the goal of creating leading-edge technologies that will drive national competitiveness in advanced industries.

Going beyond the single-discipline research structure of traditional universities, IMMS aspires to be a "problem-solving convergence research institute" built on an open platform that connects universities, government research institutes, industry, and world-class overseas institutions. The growth of each individual researcher, their leap into an independent investigator, and the creation of world-leading research outcomes (including publications in top-tier journals such as those in the Nature and Science families) are the central values guiding this institute's operation.

IMMS operates five Technical Groups that organically connect the full cycle from materials design to the operation of autonomous experimental platforms (TG1 Frontier Materials · TG2 Multiscale Computation · TG3 Multiscale Characterization · TG4 Frontier Device Solutions · TG5 Scalable Self-Driving Laboratory), and on top of this foundation drives a "Core Project (CP)" system that addresses national and societal challenges. This environment — in which the full research infrastructure from atomic/molecular-scale synthesis to AI-based autonomous laboratories can be utilized — enables world-leading research in the fields of next-generation semiconductors, hydrogen energy, autonomous laboratories, and batteries.

■ Core Project (CP) System — Problem-Centered Convergence Research

This announcement integrates the recruitment of postdoctoral researchers and research professors for the four Core Projects below. Each CP is an independent research group organized around a specific problem, and applicants should select the CP that best matches their own expertise.

The Four Core Projects of IMMS

CP1. Next-Generation Semiconductor Research Group — Extreme-environment semiconductors · Next-generation optical semiconductors · Organic–inorganic hybrid optoelectronic systems

CP2. Hydrogen Energy System Research Group — MOF-based hydrogen storage and utilization · Highly stable OPV–PEC integrated water electrolysis systems

CP3. AI-Driven Self-Driving Laboratory Research Group — AI- and robotics-driven autonomous discovery platform for five future materials, operating an integrated suite of 10 workstations

CP4. Next-Generation All-Solid-State Battery Research Group — All-solid-state Li-metal / Li-S / Li-O_2 batteries · Solid electrolyte–electrode interface control · Polymer-based ion conductors

2 Recruitment Projects and Fields

This announcement integrates the recruitment of postdoctoral researchers and research professors for the four Core Projects (CP1 – CP4) of IMMS. Applicants should select the Core Project that best matches their expertise and apply directly to the CP leader professor of that project.

Core Project	Recruitment Content for Postdoctoral Researcher · Research Professor	CP Leader
CP1	**Next-Generation Semiconductor Research Group**	**Prof. Kyeongkon Kim**
Project Title: Development of Extreme-Environment Semiconductors, Next-Generation Optical Semiconductors, and High-Efficiency Organic–Inorganic Hybrid Optoelectronic Systems • Reliability and operating mechanisms of silicon / compound-semiconductor devices for extreme (high/low temperature) environments • Design, fabrication, and characterization of photonic / optoelectronic devices • Design of extreme-environment semiconductors for next-generation AI hardware applications • Development of organic–inorganic hybrid optoelectronic systems, including optical signal processing and interface integration		
CP2	**Hydrogen Energy System Research Group**	**Prof. Woo Jae Kim**
Project Title: MOF-Based Hydrogen Storage and Utilization, and Development of a Highly Stable OPV–PEC Integrated Water Electrolysis System • Synthesis and optimization of high-specific-surface-area MOF materials for low-temperature hydrogen storage • Analysis of gas adsorption (N_2, H_2) behavior and thermodynamic stability of crystalline porous materials • Development and optimization of water-stable organic photovoltaic (OPV) devices • Development of conducting-polymer (PEDOT:PSS) based OPV–PEC interlayers • Design of OPV–PEC integrated water electrolysis systems, achieving STH efficiency of 10% or higher		
CP3	**AI-Driven Self-Driving Lab.Research Group**	**Prof. Jonggeol Na**
Project Title: Development of an AI-Based Multiscale-Material Self-Driving Laboratory (SDL) Platform Construction of an autonomous discovery platform for five future core materials (MOF · chiral nanoparticles · superionic conductors · conducting polymers · chiral supramolecular assemblies). Select one of the three tracks below (multiple selections possible): • Track A: Materials Synthesis / Automation Specialist Researcher (deep experimental expertise in the five target materials + implementation of robotic / automated workflows) • Track B: SDL Process Systems Engineering Specialist Researcher (Bayesian optimization · Lab OS ·		

Core Project	Recruitment Content for Postdoctoral Researcher · Research Professor	CP Leader
orchestration) • Track C: AI-Driven Materials Researcher (generative models · MLIP · active-learning-based experiment planning automation)		
CP4	**Next-Generation All-Solid-State Battery Research Group**	**Prof. Kwan Woo Nam**
Project Title: Development of High-Performance, High-Stability Next-Generation All-Solid-State Batteries (including ion conductors and artificial interfacial layers) • Development of all-solid-state lithium-metal / lithium-sulfur / lithium-oxygen batteries • Solid-electrolyte–electrode (cathode / anode) interface control technology • Plasmonic-photocatalyst- and chiral-catalyst-based suppression of the Li-S shuttle and control of the Li-O_2 interface • Polymer/nanomaterial-based ion conductors and artificial interfacial layers, and dendrite suppression • Conducting-polymer-based interface control for all-solid-state lithium-ion cells		

※ When applying, please clearly indicate the target CP in the email subject or body (e.g., "Applying to CP3 / Track B preferred").

■ Number of Positions

No fixed quota per Core Project — candidates will be hired on a rolling basis whenever excellent applicants are identified (rolling recruitment throughout 2026).

3 Eligibility

The following are the general eligibility requirements that apply to applicants of all Core Projects. For detailed major / experience requirements specific to each project, please refer to the individual CP descriptions **in Section 6.**

Basic Qualifications	• Applicants who hold, or are scheduled to receive, a doctoral degree • For postdoctoral researcher positions, candidates within five years of their doctoral-degree conferral are preferred • For Research Professor, candidates with at least 1 year of post-doctoral experience ※ However, even candidates beyond five years since their degree may be exceptionally appointed through deliberation by the research unit if they demonstrate outstanding capability in the relevant field
International Applicants	Candidates who meet the eligibility requirements for an E-3 visa (a holder or prospective holder of a doctoral degree)
Common Requirements	• No restrictions on age or gender • No disqualifying grounds that would prevent international travel • Not subject to any disqualifying grounds under the personnel regulations of Ewha Womans University (Including, among others, each subparagraph of Article 33 of the State Public Officials Act, Article 56 of the Act on the Protection of Children and Juveniles against Sexual Abuse, and Article 82 of the Anti-Corruption Act) • Applicants whose employment at another public institution was canceled or terminated due to wrongful hiring, and for whom fewer than five years have passed since such cancellation/termination, are not eligible to apply
Notice for Currently Employed Applicants	For applicants currently employed in domestic research institutions as postdoctoral researchers, non-tenure-track faculty, or contract researchers at government-funded research institutes, appointment is possible only if one of the following conditions is satisfied: ① The contract with the current institution is scheduled to end within three months ② The contract is scheduled to end after three months, but the current institution (supervising professor / principal investigator / department head, etc.) has given consent to the applicant's participation ※ Appointment is only possible after the employment contract with the current institution has been fully terminated. ※ Overlapping working days between the two institutions may be regarded as unauthorized concurrent employment, and dual enrollment information in the National Pension / National Health Insurance systems will be automatically reported, which may result in administrative disadvantages.

4 Appointment Conditions

The following are the common appointment conditions that apply to all Core Projects. This institute provides comprehensive support so that postdoctoral researchers, research professors, and early-career researchers can **grow into independent investigators**.

Location	Ewha Womans University IMMS (52 Ewhayeodae-gil, Seodaemun-gu, Seoul, Republic of Korea)
Position	Full-time Postdoctoral Researcher or Research Professor
Start of Research	• September 2026 (negotiable) • Start date can be adjusted flexibly to suit the applicant's doctoral-degree schedule and personal circumstances
Type of Employment	• Contract-based (one-year contracts, renewable based on research performance) • After the initial contract, renewal operates on an annual basis • Long-term extension is possible within the institute's program period (total 10 years, 2025 – 2035) — ensuring a stable research environment
Salary	• Average annual salary of KRW 70 million, up to a maximum of KRW 90 million (negotiable based on career and expertise) • Set at the highest tier of domestic postdoctoral researcher / research professor compensation ※ Includes statutory employer contributions such as the four major insurances
Benefits	The four major insurances are provided, and employee benefits follow those of Ewha Womans University faculty and staff

■ Researcher Development and Research Support Programs

IMMS goes beyond a conventional postdoctoral / research-professor appointment: it offers an environment in which researchers can carry out world-leading research while **taking a leap toward becoming independent investigators (faculty, etc.)**. The institute runs the following multifaceted support programs so that every researcher can concentrate on their own research topic.

▸ Research Support

- Opportunity to carry out world-leading research — an environment to commit to ambitious projects targeting top-tier journals such as Nature and Science
- Active support for the infrastructure needed to carry out research — access to the full-cycle research infrastructure of TG1 – TG5 (synthesis · computation · characterization · devices · autonomous labs)
- Support for conference registration fees and both domestic and overseas travel expenses

▸ Global Collaboration and Short-Term Visits

- Opportunities for exchange and short-term visits with world-leading overseas collaborative research groups
- Key collaborative institutions: UCL (Advanced Propulsion Lab, Manufacturing Futures Lab), University of Liverpool, Imperial College London, Northwestern University, Harvard Institute of Medicine, Max Planck Institute, Kyoto iCeMS, Osaka SANKEN, EMPA, Chiral Nano, etc.
- Joint mentoring with overseas scholars — multi-angle advisory support from research-direction setting to paper publication

▸ **Independent-Investigator Development (Faculty Preparation Team)**

- **Faculty Preparation Team** — for postdoctoral researchers and research professors aspiring to a faculty position, mentoring on research planning, securing independent grants, and setting up a new laboratory
- Support for linkage with major postdoctoral / early-career fellowships (Sejong Science Fellowship, NRF Postdoctoral Fellowship Program, etc.) — mentoring throughout the entire process, from application writing to interview preparation
- PI-led strategic mentoring to identify independent research topics and to secure large-scale grant funding
- Active support from Ewha Womans University faculty, including writing recommendation letters for faculty appointments and connecting applicants to recommendation networks

▸ **Opportunities to Expand Research Horizons**

- Opportunities for convergence with diverse academic fields — free collaboration across IMMS's 30+ faculty members and across its TGs
- Industry collaboration and technology commercialization opportunities — support for diversified career paths such as entrepreneurship, industry leadership, and policy engagement
- Opportunity to participate in the expansion of Open-Access SDL — contribute as an initial member to the construction of a 500-pyeong (≈1,650 m^2) global self-driving laboratory
- Opportunity to contribute to national research assets by helping build databases of research processes and outcomes

5 Recruitment Process and Required Documents

The following procedure is carried out on a rolling basis until each research unit has filled its appointment targets. Submit Step 1 (application / CV) **simultaneously** to the corresponding CP leader professor and the administrative contact (Ms. Sunghee Choi). After internal review, applicants who pass the document review will be individually contacted with requests for additional documents and interview scheduling.

■ Recruitment Process

Step	Content	Notes
Step 1	Submission of application (CV) • Send by email simultaneously to the CP leader professor and the administrative contact (Ms. Sunghee Choi) • State the target CP in the email subject (and, for CP3, the preferred track)	All applicants
Step 2	Internal review by the research unit • The CP leader and the collaborating faculty review the application • (CP3) If applicants are concentrated on a specific mentor, mentor reassignment may be discussed	-
Step 3	Notification of document-review results and request for additional materials • Interviewees will be individually informed of their schedule • Additional documents: research plan, recommendation letter from supervisor, representative publications, etc.	Case-by-case
Step 4	Interview (oral presentation) • Conducted one to two times per research unit • Both online and offline presentations are accepted	-
Step 5	Finalization of the appointment candidate and verification • Candidates are finalized and notified based on interview outcomes • Verification of the information and supporting documents in the application / CV, including any disqualifying grounds	Case-by-case
Step 6	Final appointment • Conducted in accordance with Ewha Womans University's personnel regulations and appointment procedures • Details regarding appointment documents will be provided individually	-

※ The appointment is contingent upon the candidate securing legal residency status before their start date

■ Required Documents

At the application stage, only a CV is required. Additional documents are submitted only by applicants selected for an interview after passing the document review.

Document	Description	Submission Timing
Application (CV) × 1	• Free format • Must include education, research experience, publications, patents, awards, and research projects • In the application email, state the target CP / (for CP3) preferred track / main areas of expertise	All applicants
Research Plan × 1	• Recommended within two A4 pages (free format) • Research objectives, research methods, relevance to the project, etc.	Interviewees only
Recommendation Letter × 1 – 2	• Free format • From the supervising professor or principal investigator (PI), etc. ※ Attach a consent form for the collection and use of personal information	Interviewees only
Representative Publications (1 – 3)	Submit as PDF files	Interviewees only

■ Where to Submit

Please submit your application (CV) by email **simultaneously to both of the addresses below** (CP leader professor + administrative contact).

Role	Name / Position	Email
CP1 Leader (for CP1 applicants)	Prof. Kyeongkon Kim	kimkk@ewha.ac.kr
CP2 Leader (for CP2 applicants)	Prof. Woo Jae Kim	wjkim1974@ewha.ac.kr
CP3 Leader (for CP3 applicants)	Prof. Jonggeol Na	jgna@ewha.ac.kr
CP4 Leader (for CP4 applicants)	Prof. Kwan Woo Nam	kwanwoo@ewha.ac.kr
Administrative Contact (common to all CPs)	Ms. Sunghee Choi	e600315@ewha.ac.kr

*※ Please send your email **simultaneously** to the leader of the CP you are applying to and to Ms. Sunghee Choi.*

6 Research Area Details

The research content and required / preferred qualifications for each Core Project are given below. (For the research period and working conditions, see Section 4 — Appointment Conditions.)

CP1.

Next-Generation Semiconductor Research Group

Project Title	Development of Extreme-Environment Semiconductors, Next-Generation Optical Semiconductors, and High-Efficiency Organic–Inorganic Hybrid Optoelectronic Systems
CP Leader	Prof. Kyeongkon Kim (kimkk@ewha.ac.kr)

Aiming to develop the next generation of semiconductors, CP1 focuses on extreme-environment (cryogenic and high-temperature) semiconductors that overcome the limitations of conventional electronic devices, as well as on next-generation optical semiconductors and organic–inorganic hybrid optoelectronic devices that jointly control optical and electronic signals. We are recruiting outstanding researchers who will help reinvent the semiconductor paradigm together.

▸ **Main Research Areas**

- Reliability and operating mechanisms of silicon and compound-semiconductor devices in extreme environments (high/low temperature)
- Design, fabrication, and characterization of photonic / optoelectronic devices
- Design foundations for extreme-environment semiconductors aimed at next-generation AI hardware
- Integration of optical signal processing and interface systems

▸ **[Required Qualifications]**

- Doctoral degree holder or expected degree holder in electronic / electrical engineering, physics, materials, or semiconductor-related fields
- Hands-on experimental experience in temperature-dependent (cryogenic / high-temperature) electrical characterization of semiconductor devices / circuits, or in optical characterization
- Experience with device simulation and design tools
- First-author publications in SCI-level international journals

▸ **[Preferred Qualifications]**

- Lead-author publications in major semiconductor and photonic-device journals (IEEE, Nature-family journals, etc.)
- Experience presenting at internationally renowned conferences (IEDM, ISSCC, VLSI, etc.)
- Research experience with compound semiconductors (GaN, SiC, etc.) or organic semiconductors

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CP2.

Hydrogen Energy System Research Group

Project Title	MOF-Based Hydrogen Storage and Utilization, and Development of a Highly Stable OPV–PEC Integrated Water Electrolysis System
CP Leader	Prof. Woo Jae Kim (wjkim1974@ewha.ac.kr)
Subtopic Contacts	MOF: Prof. Jaewoong Lim (jaewoonglim@ewha.ac.kr) / PEC: Prof. Byoung Hoon Lee (leebhoon@ewha.ac.kr)

CP2 focuses on the development of core materials and systems for realizing a hydrogen economy. It combines the development of MOF (metal–organic framework)-based hydrogen storage and utilization systems with that of highly stable organic photovoltaic (OPV) devices and solar water electrolysis (Photoelectrochemical, PEC) systems, and we are recruiting outstanding researchers who can lead both areas in an integrated manner.

1) MOF-Based Hydrogen Storage and Utilization Materials

▸ **Main Research Areas**

- Synthesis and optimization of high-specific-surface-area MOF materials for low-temperature hydrogen storage
- Analysis of gas adsorption behavior (N_2, H_2, etc.) and thermodynamic stability of crystalline porous materials
- Design of low-cost, high-density hydrogen-storage materials that can replace liquid hydrogen, and performance optimization
- Development of high-energy materials for hydrogen utilization and water electrolysis

▸ **[Required Qualifications]**

- Doctoral degree holder or expected degree holder in a field related to metal–organic frameworks (MOFs)
- Experience in crystal-structure analysis using XRD
- Experience operating high-/low-temperature gas adsorption equipment and analyzing the resulting data
- First-author publications in SCI-level international journals

▸ **[Preferred Qualifications]**

- Experience developing and analyzing flexible MOF materials
- Experience designing and synthesizing organic ligands
- Research experience with water-electrolysis electrodes and electrochemical systems
- Publications in journals with IF 10 or higher

2) Highly Stable Organic Photovoltaics and Integrated Water Electrolysis System

▸ **Main Research Areas**

- Development and optimization of water-stable organic photovoltaic (OPV) devices
- Development of conducting-polymer (PEDOT:PSS) based, highly conductive and highly adhesive OPV–PEC interlayers
- Design and performance optimization of OPV–PEC integrated water electrolysis systems

- System-integration research targeting Solar-to-Hydrogen (STH) efficiency of 10% or higher

▸ **[Required Qualifications]**

- Doctoral degree holder or expected degree holder in next-generation solar cells (organic photovoltaics, etc.), conducting-polymer materials, or photoelectrochemistry (PEC)
- Extensive hands-on experience in fabricating organic photovoltaic devices and evaluating their optoelectronic characteristics
- Experience in the fabrication and electrochemical characterization of conducting-polymer (PEDOT:PSS, etc.) thin films
- First-author publications in SCI-level international journals

▸ **[Preferred Qualifications]**

- Experience developing organic photovoltaic devices
- Research experience with water-electrolysis electrodes and electrochemical systems
- Research experience with functional adhesive materials
- Lead-author publications in journals with IF 10 or higher

CP3.

AI-Driven Self-Driving Laboratory Research Group

Project Title	Development of an AI-Based Multiscale-Material Self-Driving Laboratory (SDL) Platform
CP Leader	Prof. Jonggeol Na (jgna@ewha.ac.kr)
Co-Mentorship	Panel of 10 co-advising faculty (see the end of this section)

CP3 aims to build an AI-based Self-Driving Laboratory that enables autonomous discovery across five future core materials — metal–organic frameworks (MOF), chiral nanoparticles (NP), superionic conductors (SC), conducting polymers (CP), and chiral supramolecular assemblies (CSA). The project is operated as a joint-mentoring convergence research program with a panel of 10 faculty members.

Why CP3-SDL at IMMS Ewha?

CP3-SDL is the first project in Korea to implement a multi-material, integrated self-driving laboratory that goes beyond any single material. Participating researchers will begin immersive research in the approximately **100-pyeong (≈330 m²) dedicated CP3 SDL research space** within the IMMS advanced research facility at Ewha Womans University, and will also have the opportunity to participate in the roadmap to expand to the **approximately 500-pyeong (≈1,650 m²) Open-Access SDL**.

In the following differentiated research environment, you can elevate your expertise onto the world stage.

- World-leading autonomous laboratory inside a dry room (dedicated to superionic conductors; isolated environment with a dew point below −40 °C)
- Integrated chiral-spectroscopy (CD · CPL · PL) autonomous laboratory — closed-loop exploration of chiral nano / supramolecular luminescent materials
- Robotics / AI platform for autonomous XRD measurement and analysis — phase identification and active-learning-based condition optimization
- Integrated operation of 5 materials × 10 workstations — an experimental platform of unprecedented scale from the perspective of process systems engineering, AI, and robotics
- Global collaboration network — opportunities for exchange with world-leading SDL research groups such as UCL, University of Liverpool, Imperial College, Northwestern, Harvard, and Max Planck

The goal is clear: to produce **world-leading research outcomes (top-tier journals including those in the Nature and Science families)**. The personal growth and research achievements of each researcher are at the center of this program, and we will spare no effort to provide the infrastructure, funding, and collaboration opportunities needed to realize that goal.

Target Materials	MOF · Chiral Nanoparticle · Superionic Conductor · Conducting Polymer · Chiral Supramolecular Assembly
Core Infrastructure	Integrated operation of 10 workstations (S1 – S10) — SDL infrastructure on the scale of several billion KRW, built out in stages
Research Methodology	DMTA (Design–Make–Test–Analyze) closed loop; autonomous exploration based on Bayesian / active learning

■ Recruitment Tracks (A / B / C)

CP3 recruits applicants for three tracks concurrently. Applicants should choose the track closest to their expertise; those qualified for multiple tracks may indicate their preference order.

[Track A] Materials Synthesis / Automation Specialist Researcher

We are looking for researchers who have deep experimental expertise in one or more of the five target materials (MOF · NP · SC · CP · CSA) and who can implement the synthesis, post-processing, and characterization workflows of those materials on robotic / automated systems in an SDL environment. We warmly welcome doctoral-level researchers in the relevant experimental areas — including inorganic / organic / polymer / nano synthetic chemists, thin-film and coating process specialists, and electrochemical / spectroscopic measurement specialists.

▸ Main Research Areas

- Design and robotic-system demonstration of automated synthesis / post-processing / analysis protocols for the material of one's own specialty
- Construction of autonomous experimental workflows with improved reproducibility and throughput compared to manual experiments, and connection to data pipelines
- Closed-loop materials exploration in close collaboration with the materials-team faculty and with researchers in the AI / process-systems-engineering tracks

▸ [Required Qualifications]

- Doctoral degree holder or expected degree holder in chemistry, materials, chemical engineering, physics, or a closely related field
- Substantial hands-on experience in the synthesis and characterization of at least one of the target materials (MOF / NP / SC / CP / CSA)
- First-author publications in SCI-level international journals

▸ [Preferred Qualifications]

- Experience using or developing laboratory automation (Opentrons, liquid handlers, robotic arms, etc.)
- Experience or knowledge regarding automatic control of research equipment via communication protocols (RS232, TCP/IP, REST API, etc.)
- Experience writing scripts in Python or similar languages for experimental data acquisition / processing
- Publications in journals with IF 10 or higher, or presentations at top-tier conferences

[Track B] SDL Process Systems Engineering Specialist Researcher

We are looking for researchers who will design and implement the control and optimization infrastructure that serves as the brain and nervous system of the self-driving laboratory. This track is ideal for researchers with a background in process systems engineering (PSE), control / automation, or chemical / electrical / mechanical / computer engineering, who wish to gain experience integrating many heterogeneous experimental instruments and robots into a single platform and driving it with AI optimization algorithms.

▸ **Main Research Areas (choose one or combine several of the three sub-areas below)**

- Optimization algorithms: experimental-design automation using Bayesian optimization (multi-objective, mixed-variable), active learning, and derivative-free optimization
- Control-system design and automation: architecture design for robot–instrument integration, in-situ sensor-feedback process control, and mechanisms for ensuring experimental reproducibility
- Lab operating system (Lab OS) and orchestration: multi-instrument integration drivers, experiment scheduling, and real-time monitoring dashboards

▸ **[Required Qualifications]**

- Doctoral degree holder or expected degree holder in chemical / electrical / mechanical / computer / control / systems engineering, or a closely related field
- Substantive research experience in at least one of the three sub-areas listed above
- System-software development and algorithm-implementation skills in Python or similar languages
- First-author publications in SCI-level international journals

▸ **[Preferred Qualifications]**

- Experience using Bayesian-optimization libraries or active-learning frameworks such as BoTorch, Ax, Gryffin, or EDBO
- Experience with robot control (UR, AMR, etc.) or experimental-instrument driver development
- Experience with workflow orchestration tools (Prefect, ROS, etc.) or building multi-instrument integration architectures
- Domain knowledge in chemistry, materials, or energy, or experience collaborating with those fields

[Track C] AI-Driven Materials Researcher

We are looking for researchers who will develop AI models that understand and design materials by combining experimental and simulation data. We welcome applicants with a machine-learning / deep-learning-based materials research background, as well as PhD-level researchers in chemistry or materials who have extended their methodology into AI.

▸ **Main Research Areas**

- Development of models for property prediction and inverse design of materials (including generative models such as diffusion and flow-matching)
- Experiment-planning automation based on agentic AI and active learning
- Integration of Machine Learning Interatomic Potentials (MLIPs) and foundation models with SDLs
- Automatic-interpretation pipelines for spectroscopic / diffraction data (based on CNNs, Transformers, etc.)

▸ **[Required Qualifications]**

- Doctoral degree holder or expected degree holder in computer science, artificial intelligence, or statistics; or in a chemistry / materials + AI convergence field
- Practical research skills with deep-learning frameworks (PyTorch / JAX) and in ML research
- First-author publications in SCI-level international journals, or at top-tier AI conferences (NeurIPS / ICML / ICLR, etc.)

▸ **[Preferred Qualifications]**

- Research experience in uncertainty quantification, sim-to-real, or transfer learning
- Research experience in generative-model-based molecular / materials design
- Experience building large-scale experimental-data pipelines and collaborating with experimental researchers

□ No prior SDL experience? That's okay.

Self-driving laboratories sit at the intersection of chemistry, materials, AI, and automation, and researchers with full prior SDL experience are extremely rare worldwide. This program is designed to help applicants add the new capabilities required by self-driving laboratories (instrument integration, orchestration, active learning) on top of their existing expertise, and to grow into leading figures in the next generation of autonomous research. We warmly welcome outstanding researchers from diverse backgrounds.

■ Co-Advising Faculty Panel (10 Members)

This project is a joint-mentoring convergence research program led by 10 faculty members. Expertise in materials chemistry, process systems engineering, and artificial intelligence is brought together in one place so that, even on the SDL platform, deep research into each individual material can continue without compromise. Each postdoctoral researcher / research professor determines their main mentor through consultation, based on their research direction, while maintaining day-to-day exchange and collaboration with the other faculty members.

Faculty	Department	Main Research Areas
Jonggeol Na	Chemical Engineering and Materials Science	CP3 Lead · Process Systems Engineering · Self-Driving Laboratory · AI for Chemistry
Hoi Ri Moon	Chemistry and Nanoscience	IMMS Director · Metal–Organic Frameworks (MOF) · Gas Storage and Separation
Byoung Hoon Lee	Chemical Engineering and Materials Science	Conducting Polymers · Wearable Flexible Electronics
Kwan Woo Nam	Chemical Engineering and	Next-Generation Rechargeable Batteries · Solid-State Ion Conductors

Faculty	Department	Main Research Areas
	Materials Science	
Won-Suk Kim	Chemistry and Nanoscience	Flow-Chemistry Automation · Organic Synthesis
Dong Ha Kim	Chemistry and Nanoscience	IMMS Deputy Director · Chiral Plasmonics · Block-Copolymer Self-Assembly · Nano-Hybrids
So-Jung Park	Chemistry and Nanoscience	Nanoparticle Self-Assembly · Plasmonic Nanoparticles · Block Copolymers
Jaewoong Lim	Science Education	MOF Defect Engineering · Ligand Functionalization
Sookyung Kim	Artificial Intelligence	Scientific ML · Explainable AI · AI-driven Discovery
Hyunsoo Cho	Artificial Intelligence	Natural Language Processing (NLP) · Large Language Models (LLM)

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CP4.

Next-Generation All-Solid-State Battery Research Group

Project Title	Development of High-Performance, High-Stability Next-Generation All-Solid-State Batteries (including ion conductors and artificial interfacial layers)
CP Leader	Prof. Kwan Woo Nam (kwanwoo@ewha.ac.kr)
Subtopic Contacts	• Nano and polymeric materials for all-solid-state interface control · novel energy storage: Prof. So-Jung Park (sojungpark@ewha.ac.kr) • All-solid-state Li-M /Li-S / Li-O_2 batteries & Plasmonic / chiral catalysts for Li-S / Li-O_2 batteries: Prof. Dong Ha Kim (dhkim@ewha.ac.kr) • All-solid-state Li-S batteries· ionic conductor: Prof. Kwan Woo Nam (kwanwoo@ewha.ac.kr) • Polymer-based Ionic conductors · artificial interfacial layers: Prof. Byoung Hoon Lee (leebhoon@ewha.ac.kr)

CP4 aims to develop the high-performance, high-stability all-solid-state batteries at the core of next-generation energy storage technology. The group pursues a multifaceted approach — including the development of all-solid-state Li-metal / Li-S / Li-O_2 batteries, solid-electrolyte–electrode interface control, and polymer-based ion conductors and artificial interfacial layers — and we are recruiting outstanding researchers who will lead world-leading research in this area.

1) All-solid-state interface control · novel energy storage

- [M**ain Research Areas]**
  - Development of solid electrolyte-electrode (cathode/anode) interface control technologies
  - Research on novel energy storage systems
  - Design and synthesis of functional polymers, synthesis and characterization of nanomaterials, structure-property relationships for battery applications
- **[Required Qualifications]**
  - Doctoral degree holder or expected degree holder in Polymer Chemistry, Materials Science, or Synthetic Chemistry
  - Specialized experience in the design and synthesis of functional polymers
  - Hands-on experience in nanomaterial synthesis and advanced structural characterization
  - First-author publications in SCI-level international journals
- **[Preferred Qualifications]**
  - Expertise in the design and synthesis of functional polymers and their application in interface engineering
  - Expertise in nanomaterial synthesis and structure-property relationships
  - Lead-author publications in journals with IF 10 or higher
  - Strong determination to grow as an independent researcher after the postdoctoral or research

professor period

2) All-solid-state Li-M /Li-S / Li-O2 batteries & Plasmonic / chiral catalysts for Li-S / Li-O_2 batteries

- **[Main Research Areas]**
  - Research on suppressing the shuttle effect and achieving high performance in Li-S batteries using plasmonic photocatalytic cathode materials
  - Development of solid electrolyte-electrode interface control technologies for solid-state Li-S / Li-O_2 batteries based on plasmonic-chiral catalysts
- **[Required Qualifications]**
  - Doctoral degree holder or expected degree holder in Catalysis, Plasmonics, or Next-Generation Battery Science
  - Expertise in all-solid-state batteries & plasmonic or chiral nanomaterials for electrode catalysts
  - Experience in designing light-assisted electrochemical systems or evaluating photocatalytic-battery hybrid systems
  - First-author publications in SCI-level international journals
- **[Preferred Qualifications]**
  - Research experience in next-generation battery devices (Li-metal, Li-S, Li-O2, lithium-ion, etc.) and electrochemical systems
  - Research experience related to light-matter interactions or chiral nanomaterials
  - Lead-author publications in journals with IF 10 or higher
  - Strong determination to grow as an independent researcher after the postdoctoral or research professor period

3) All-solid-state Li-S batteries•Ionic conductor

- **Main Research Areas**
  - Research experience in next-generation battery devices (Li-metal, Li-S, lithium-ion, etc.) and electrochemical systems
  - Development of solid electrolyte-electrode (cathode/anode) interface control technologies
  - Synthesis and characterization of ion conductors, and electrochemical analysis of solid-state batteries
- **[Required Qualifications]**
  - Doctoral degree holder or expected degree holder in the field of solid-state batteries
  - Extensive experience in fabricating next-generation battery devices and evaluating electrochemical characteristics
  - Hands-on experience in synthesizing oxide-based ionic conductors
  - First-author publications in SCI-level international journals
- **[Preferred Qualifications]**
  - Research experience in solid-state battery interface control and electrolyte materials

- Experience in battery cell fabrication and evaluation
- Lead-author publications in journals with IF 10 or higher
- Strong determination to grow as an independent researcher after the postdoctoral or research professor period

4) Polymer-Based Ionic Conductors and Artificial Interfacial Layers

▸ **Main Research Areas**

- Development of solid-state/semi-solid lithium-ion batteries and artificial interfacial layers to suppress dendrite formation between solid electrolytes and electrodes
- Design and polymerization of polymer electrolytes for solid electrolytes
- Development of solid electrolyte-electrode interface control technologies for solid-state lithium-ion batteries based on conducting polymers

▸ **[Required Qualifications]**

- Doctoral degree holder or expected degree holder in the field of solid-state batteries
- Experience in designing, synthesizing, and analyzing core materials for solid-state batteries
- First-author publications in SCI-level international journals

▸ **[Preferred Qualifications]**

- Research experience in the polymerization of polymer electrolytes and polymer electrolyte-inorganic (e.g., MOF) composite materials
- Experience in evaluating the electrochemical properties of conducting polymers
- Lead-author publications in journals with IF 10 or higher
- Strong determination to grow as an independent researcher after the postdoctoral or research professor period

7 Final Appointment and Verification

- The information provided by appointment candidates and any disqualifying grounds will be reviewed; if no special issues are found, the appointment candidate will be officially appointed.
- Appointment may be canceled if false entries in the application, forgery or alteration of supporting documents, or similar issues are discovered.
- Appointment may be canceled if any of the disqualifying grounds under Article 33 of the State Public Officials Act are discovered.
- If a person whose final appointment has been confirmed cannot be properly appointed due to loss of contact or similar reasons, they will be deemed to have withdrawn their application.
- Postdoctoral researchers and research professors sign an employment contract directly with Ewha Womans University and are appointed in accordance with the institution's personnel regulations and appointment procedures.

8 Other Important Notes

- Depending on the status of postdoctoral researcher / research professor appointments, recruitment may be closed early without prior notice.
- The applicant bears sole responsibility for any disadvantages arising from errors / omissions in the application, failure to meet eligibility requirements, unreachable contact, or missed interview notices.
- If the contents of the application / CV differ from the supporting documents, if supporting documents are not submitted, or if false supporting documents are submitted, the applicant may be excluded from the candidate pool or have their appointment canceled.
- Applicants may apply to multiple Core Projects, but final appointment is possible for only one CP.
- Submitted documents will be used only for recruitment purposes and will not be returned, regardless of the hiring outcome.

9 Contact

For inquiries about research content, contact the faculty responsible for each subtopic; for inquiries about application procedures and required documents, contact Ms. Sunghee Choi. Please be sure to **submit your application simultaneously to both the CP leader and Ms. Sunghee Choi**.

■ Research Content Inquiries (Faculty by Subtopic)

For specific questions about research content, please contact the faculty member who substantially handles the relevant research topic.

Core Project / Subtopic	Faculty	Email
CP1. Next-Generation Semiconductors (extreme environment · optical semiconductors · hybrid optoelectronics)	Prof. Kyeongkon Kim	kimkk@ewha.ac.kr
CP2. Hydrogen Energy System (overall)	Prof. Woo Jae Kim	wjkim1974@ewha.ac.kr
└ CP2-MOF-based hydrogen storage / utilization	Prof. Jaewoong Lim	jaewoonglim@ewha.ac.kr
└ CP2-OPV · PEC integrated water electrolysis	Prof. Byoung Hoon Lee	leebhoon@ewha.ac.kr
CP3. AI-Driven Self-Driving Laboratory (SDL) — CP3 Lead	Prof. Jonggeol Na	jgna@ewha.ac.kr
CP4. Next-Generation All-Solid-State Battery (overall)	Prof. Kwan Woo Nam	kwanwoo@ewha.ac.kr
└ CP4-nano and polymeric materials for all-solid-state interface control · novel energy storage	Prof. So-Jung Park	sojungpark@ewha.ac.kr
└ CP4-plasmonic / chiral catalysts for Li-S / Li-O_2	Prof. Dong Ha Kim	dhkim@ewha.ac.kr
└ CP4-lithium-sulfur all-solid-state battery	Prof. Kwan Woo Nam	kwanwoo@ewha.ac.kr

Core Project / Subtopic	Faculty	Email
(ABML)		
└ CP4-polymer-based ion conductors · artificial interfacial layers	Prof. Byoung Hoon Lee	leebhoon@ewha.ac.kr

■ Application and Administrative Inquiries

Role	Name / Position	Email
Administrative Contact (common to all CPs)	Ms. Sunghee Choi (IMMS Administrative Contact)	e600315@ewha.ac.kr

※ *Please send your email **simultaneously** to the leader of the CP you are applying to and to Ms. Sunghee Choi.*

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