Joon-Gon Son

Senior Researcher

- Senior Specialist in Laser Optics & X-ray Technology
- Proven Expertise in research institutions and industry, specializing in advanced instrumentation
- Extensive Experience in optical system design, laser-matter interaction, and ultrafast laser technologies
- Innovative Problem Solver with 32 patents in optics and industrial technologies

+

SKILLS

Basic | C++ | MATLAB | SRIM | COMSOL | LabView | Python | CAD | Microcontroller

WORK EXPERIENCE

11/2021 - 07/2025

Senior Researcher, Secondary Source Division

ELI-ALPS (Extreme Light Infrastructure) - Szeged, Hungary

- Development of ultrafast high-power laser-based secondary light sources
- Time-resolved pump-probe spectroscopy & Nonlinear light-matter interaction
- Computational design and simulation of a capillary gas cell for electron acceleration via COMSOL

09/2019 - 10/2021

Research Fellow

University of Szeged - Szeged, Hungary

- High-intensity laser-driven particle acceleration for ion and neutron generation
- Design of target system and high-precision microscope for tight focusing
- Detection and analysis of accelerated particle energy using CR-39, MCP, and Thomson Parabola Spectrometer (TPS) - MATLAB

09/2008 - 08/2011

Researcher

APRI (Advanced Photonics Research Institute) - South Korea

- Laser-Induced Breakdown Spectroscopy (LIBS) for non-destructive & remote sensing applications
- Development of ultrasensitive optical detection via synchronized gas pulse jet and laser pulses

■ 03/2007 - 08/2008

Senior Researcher

KIMM (Korea Institute of Machinery & Materials) - South Korea

- Tissue regeneration research using electrospinning and bioplotter-based scaffold fabrication

■ 02/2004 - 02/2007

Senior Researcher

SAMSUNG ELECTRONICS, R&D Center - South Korea

- Optical system design for BLU (back-light unit), LGP (light guide plate), and optical film - LightTools, MATLAB
- Circuit design of inverters and LED drivers for LCD

■ 08/1998 - 02/2001

Sergeant as Technical Soldier

Republic of Korea Air Force - South Korea

- Maintenance and operations of electrical facilities in missile artillery unit

EDUCATION

■ 2019

Doctorate in Physics & Photon Science

Gwangju Institute of Science & Technology (GIST) - South Korea

Dissertation: "Study on the light-matter interactions with pulsed lasers and the ultrashort soft x-ray generation"

Advisor: Prof. Do-Kyeong Ko

- Development of Ultrashort-Pulsed Monochromatic X-ray Generation System with customized XRD
- Coherent Diffraction Imaging by XUV via High Harmonic Generation (HHG) with Femtosecond Laser - MATLAB

■ 2004

Master's Degree in Physics

Hanyang University - Seoul, South Korea

Thesis: "Polarization Modulation by Optical Diffraction Effect"

Advisor: Prof. Seok Ho Song

• Monte Carlo Algorithm-Based Design and Fabrication of Diffractive Optical Elements (DOE) for Beam & Pulse Shaping - LabView, MATLAB

■ 2001

Bachelor's Degree in Electrical Engineering

Hanyang University - Seoul, South Korea

• Specialization in Microcontrollers, Circuit Design, Motorization and Embedded Systems (8086, HC11, KS88 and etc.)

LANGUAGES

■ Korean	**Native**
■ English	**Advanced**
■ Chinese	**Intermediate**

AWARDS

- **Feb. 15th, 2019: Excellence in Research Award at GIST**
(Awarded by the Institute of Basic Science (IBS) President, with only one recipient in the department.)
- **Jan. 30th, 2015: Best Research Award, Optical Society of Korea Conference**
- **Oct. 24th, 2014: Best Research Award, Korean Physical Society Conference**

ANNEX 1

MINIMAL STANDARDS APPLICABLE AT IFIN-HH
for being awarded the professional ranks of
First Stage Researcher (Research Scientist - CS) and
Recognised Researcher (3rd rank Research Scientist - CS III)

Approved in the meeting of IFIN-HH Scientific Council of 27.02.2025 (SC Decision No. 5/27.02.2025)

Minimal Standards (at IFIN-HH)

1) IFIN-HH shall establish threshold scores ($P_{threshold}$) according to the table below.

	First Stage Researcher (CS)	Recognised Researcher (CSIII)
$P_{threshold}$	0.50	1.50

2) During the evaluation of the candidate's scientific activity, the score P is determined in the following manner:

$P=P_1+P_2$, where

P_1 : for articles where the candidate is an author, but not a first author or a corresponding author: $P_1 = \sum_i a_i/n_i^{ef}$

P_2 : for articles where the candidate is a first author or a corresponding author: $P_2 = \sum_i a_i$

a_i = is the absolute Article influence score of the scientific journal where article *i* was published, according to its year of publication as per http://www.eigenfactor.org/ for articles published until 2006 and Journal Citation Report (Web of Science) starting from 2007; if the publishing year cannot be not found in the database, the closest year shall be chosen.

n_i^{ef} = is the actual number of authors of item *i* and is determined as follows:

n_i	if $n_i \le 5$
$(n_i + 5)/2$	if $5 < n_i \le 15$
$(n_i + 15)/3$	if $15 < n_i \le 75$
$(n_i + 45)/4$	if $n_i > 75$

where n_i is typically the number of authors of item *i*. In the case of HEPP (High Energy Particle Physics) publications with a large number of authors, if the article is based on an internal note of the collaboration and the candidate is a co-author of this internal note, then n_i^{ef} can be given by the number of authors in the internal note.

The capacity as first author or corresponding author shall be determined based on the mentions in the article. Articles where authors are indicated in the alphabetical order of their name and the candidate is a first author exclusively due to their name and the alphabetical order shall not be taken into account. In the case of HEPP publications with a large number of authors, if the article is based on an internal note whose approval for sending to publication was upheld by the author, then the author is considered first author.

Minimal Standards Self-Assessment Form:

Category of Articles	Position in the List of Papers	Score	Calculation Details
	i	a_i/n_i^{ef}	Journal of Fluorescence, 2011; 21(4):1421-9, AIS=0.506, no. of authors:6, ef no:5.33
Articles in ISI Thomson Reuters ranked journals and in ISI Proceedings indexed volumes for which the candidate is **not a first author or a corresponding author**	1	**0.0773**	Applied Physics Letters 125, 141101 (2024) AIS=0.773 No. of Authors: 15 Actual No.: 10
	2	**0.2**	IEEE Transactions on Terahertz Science and Technology, Vol. 14, No. 6 (2024) AIS=1.2 (2015 year)* No. of Authors: 7 Actual No.: 6
	3	**0.205273**	Scientific Reports, 12: 8100 (2022) AIS = 1.129 No. of Authors: 6 Actual No.: 5.5
	4	**0.072405**	Plasma Phys. Control. Fusion 65 085012 (2023) AIS = 0.893 No. of Authors: 22 Actual No.: 12.333
	5	**0.050211**	Rev. Sci. Instrum. 93, 073301 (2022) AIS = 0.477 No. of Authors: 14 Actual No.: 9.5
	6	**0.125167**	Materials Science and Engineering: C, Vol. 82, 19-24 (2018) AIS = 0.751 No. of Authors: 7 Actual No.: 6
	7	**0.087143**	Applied Physics B, Vol. 116, 305-311 (2013) AIS = 0.61 No. of Authors: 9 Actual No.: 7
	8	**0.2985**	Macromolecular Rapid Communications, Vol. 29, Iss. 19, 1577-1581, (2008) AIS = 1.194 No. of Authors: 4 Actual No.: 4
	9	**0.315**	Applied Physics A (Materials Science & Processing), Vol.94, No.4, pp.781-785, (2009) AIS = 0.63 No. of Authors: 2 Actual No.: 2
	10	**0.104545**	Polymer International, Vol. 56, No. 11, pp. 1361-1366 (2007) AIS = 0.575 (2008 year) No. of Authors: 6 Actual No.: 5.5
	11	**0.1265**	Displays, Vol. 26, Iss. 1, pp 37-43 (2005) AIS = 0.506 (2008 year) No. of Authors: 4 Actual No.: 4
	SUM	**1.662044**	*Used 2015 AIS (1.2) for 2nd journal as newer data unavailable.
Articles in ISI Thomson Reuters ranked journals and in ISI Proceedings	..	a_i	
	1	**0.093**	Journal of the Korean Physical Society, Vol.73, 12, 1834-1839 (2018)

indexed volumes for which the candidate is a **first author or a corresponding author**			AIS = 0.093 No. of Authors: 6
	2	0.491	Results in Physics, Vol.12, 46-51 (2019) AIS = 0.491 No. of Authors: 5
	3	0.678	Appl. Phys. Express 11, 102401 (2018) AIS = 0.678 No. of Authors: 3
	4	0.474	Current Applied Physics, Vol. 14, 1-7 (2014), co-first author AIS = 0.474 No. of Authors: 6
	5	0.501	Applied Spectroscopy, Vol.64, Issue 11, pp.1289-1297, (2010) AIS = 0.501 No. of Authors: 6
	6	0.643	Journal of Biomaterials Science, Vol.20, pp 2089-2101, (2009) AIS = 0.643 No. of Authors: 2
	7	0.044	Polymer (Korea), Vol. 32, No. 2, pp.163-168, (2008) AIS = 0. 044 No. of Authors: 4
	SUM	**2.924**	
TOTAL		**4.586044**	

Applicant's Surname and First Name ; SON, JOON-GON

Signature ;

i. a list of maximum 10 scientific publications, the most relevant, such as: authored books, articles/studies/chapters, edited volumes, works;

Laser-Driven Ion Acceleration (1-3)

1. "Low divergent MeV-class proton beam with micrometer source size driven by a few-cycle laser pulse", Scientific Reports, 12: 8100 (2022)

https://doi.org/10.1038/s41598-022-12240-2

2. "Ion acceleration with few cycle relativistic laser pulses from foil targets", Plasma Physics and Controlled Fusion, Vol. 65, 8 (2023)

https://iopscience.iop.org/article/10.1088/1361-6587/acde0a

3. "Calibration of micro-channel plate detector in a Thomson spectrometer for protons and carbon ions with energies below 1 MeV", Review of Scientific Instruments, 93, 073301 (2022)

https://doi.org/10.1063/5.0086747

Laser-Driven X-ray Generation and Diagnostics (4-6)

4. [Patent] "Target protein tracing equipment using in laser inducing X-ray", KR10-2018-0085250 (2018.07.23) – Granted (2020.03.30)

5. "A monochromatic soft x-ray generation from femtosecond laser-produced plasma with aluminum", Journal of the Korean Physical Society, Vol.73, 12, 1834-1839 (2018)

https://doi.org/10.3938/jkps.73.1834

6. "Performance improvement of a Kα source by a high-resolution thin-layer-graphite spectrometer and a polycapillary lens", Applied Physics B, Vol. 116, 305-311 (2013)

https://doi.org/10.1007/s00340-013-5691-z

Laser-Induced Plasma Spectroscopy (7-8)

7. "Signal enhancement of laser-induced breakdown spectroscopy by applying synchronized buffer gas pulses", Applied Physics Express, 11, 102401 (2018)

https://doi.org/10.7567/APEX.11.102401

8. "Application of pulsed buffer gas jets for the signal enhancement of laser-induced breakdown spectroscopy", Applied Spectroscopy, Vol.64, Issue 11, pp.1289-1297, (2010)

https://opg.optica.org/as/abstract.cfm?URI=as-64-11-1289

ii. the list of patents and other industrial property titles, if applicable;

▶ 32 Patents (International: 4, Granted: 13, Filed: 19)

1. Fabrication method of micro 3-dimensional structure by grating mask, KR10-2004-0008518 (2004.02.09)
2. Backlight assembly and liquid crystal display comprising the same (High Efficient & Balanced LED Driver by Current Limit Method), KR10-2006-0098587 (2006.10.10)
3. Thin film transistor array substrate (Liquid Crystal Display Panel Using Photo Reactive Thin Film Transistor), KR10-2006-0059649 (2006.06.29)
4. Polarizer apparatus for high efficient polarization in LCD and Fresnel lens (High Efficient Polarizer using Modified Birefringent Lens), KR10-2006-0015020 (2006.02.16)
5. Polarizer and Liquid Crystal Display Using the Same (Enhanced Super Polarizer), KR10-2006-0013211 (2006.02.10)
6. Liquid Crystal Display (Enhanced Brightness using Optical Fiber), KR10-2005-0081227 (2005.09.01)
7. Flat Fluorescent Lamp, Backlight Assembly and Liquid Crystal Display Apparatus having the Same, KR10-2005-0073095 (2005.08.10)
8. Backlight Assembly and Display Apparatus having the Same (Uniformity & Intensity Improvement by Bent Optical Fiber), KR10-2005-0071743 (2005.08.05)
9. Backlight Assembly and Display Device having the Same (BLU brightness enhancement), KR10-2005-0052462 (2005.06.17)
10. Back Light Assembly and Display Device having the Same (UV BLU), KR10-2005-0074698 (2005.08.16)
11. Display Device (Uniformity Enhancement by TFT control), KR10-2005-0064445, (2005.07.15)
12. Back Light Assembly and Display Device having the Same (Microwave BLU), KR10-2005-0075993 (2005.08.19), US562151(2006.08.18) - **Granted KR101214952 (2012.12.17), JP5148085 (2013.02.20), CN1916733 (2010.09.29)**
13. Backlight Assembly and Display Device having the Same (Phosphor inside BLU), KR10-2005-0048409 (2005.06.07)
14. Display Apparatus (Unified LED Driver BLU), KR10-2006-0030015 (2006.04.03)
15. Liquid Crystal Display (UV Lamp BLU), KR10-2005-0110630 (2005.11.18)

16. Liquid Crystal Display (Uniformity Enhanced BLU), KR10-2005-0054667 (2005.06.23)
17. Lamp and, Back Light Assembly and Display Device having the Lamp (Hairline inside BLU), KR10-2005-0053873 (2005.06.22)
18. Liquid Crystal Display (Virtual Lamp Concept BLU), KR10-2005-0050909 (2005.06.14)
19. Back Light Unit and Liquid Crystal Display including the Same (Plasma UV Lamp BLU by Microwave), KR10-2006-0015019 (2006.02.16), US2007188102 (2006.11.21), JP2007220671 (2007.02.01) – **Granted KR101271226 (2013.05.28), US7884532 (2011.02.08)**
20. A Manufacturing Method of a Three Dimensional Scaffold, KR10-2010-0072354 (2010.07.27) – **Granted KR101092577 (2011.12.05)**
21. Bio-plotter with Vibration structure, KR10-2007-0107474 (2007.10.24) – **Granted (2009.7.3)**
22. Rotation structure of Needle Nozzle for Bio-plotter, KR10-2007-0107475 (2007.10.24) – **Granted (2009.9.17)**
23. A System for Manufacturing Regeneration of a Three Dimensional Tissue, KR10-2007-0119404 (2007.11.21) – **Granted (2009.12.11)**
24. Bio-plotter with Nozzle Formed Distorted Surface, KR10-2007-0119410 (2007.11.21) – **Granted (2009.6.2)**
25. Multi Functional Optical Film with Nano-fiber layer and an Electrohydrodynamic process thereof, KR10-2007-0123096 (2007.11.29) – **Granted (2009.12.23)**
26. A Tube of Nanofiber and Manufacturing Apparatus for a Tube Consisted of Biaxially Oriented Nanofibers, KR10-2008-0043049 (2008.05.08) – **Granted (2010.12.03)**
27. A Three Dimensional Hybrid Scaffold by Bioplotting and Electrospinning System, KR10-2008-0043050 (2008.05.08)
28. A Manufacturing Method of a Three Dimensional Scaffold, KR10-2008-0043048 (2008.05.08)
29. Particle Counter (using planar optics), KR10-2010-0033612 (2010.04.18), PCT/KR2010/008778 (2012.12.09) WO2011129511 – **Granted (2012.04.18)**
30. Particle Counter (multi-channel waveguide), KR10-2010-0033641 (2010.04.18), PCT/KR2010/008779 (2012.12.09) WO2011129512 – **Granted (2012.04.18)**
31. Process of Forming Surface Structure of Micro-Sized Pores, KR10-2013-0154525 (2013.12.12) – **Granted (2015.11.24)**
32. Target protein tracing equipment using in laser inducing X-ray, KR10-2018-0085250 (2018.07.23) – **Granted (2020.03.30)**

iii. the list of authored books and volumes edited and published: N/A

iv. the list of articles/studies in extenso, published in mainstream international journals;

▶ **18 Journal Papers (8 as first author)**

1. P. J. Dalton, ... , **Joon-Gon Son,** "Cryogenically cooled periodically poled lithium niobate wafer stacks for multi-cycle terahertz pulses", **Appl. Phys. Lett**. 125, 141101 (2024)
https://doi.org/10.1063/5.0230877

2. Ashutosh Sharma, ... , **Joon-Gon Son,** "Linearity of Fast and Highly Sensitive LiTaO3 Pyroelectric Detectors in the Terahertz Range", **IEEE Transactions on Terahertz Science and Technology,** 19 August (2024)
10.1109/IRMMW-THz60956.2024.10697564

3. Sargis Ter-Avetisyan, ... , **Joon-Gon Son,** "Ion acceleration with few cycle relativistic laser pulses from foil targets", **Plasma Physics and Controlled Fusion**, Vol. 65, 8 (2023)
https://iopscience.iop.org/article/10.1088/1361-6587/acde0a

4. Prashant K. Singh, ... , **Joon-Gon Son**, Sargis Ter-Avetisyan, Karoly Osvay, "Low divergent MeV-class proton beam with micrometer source size driven by a few-cycle laser pulse", **Scientific Reports,** 12: 8100 (2022)
https://doi.org/10.1038/s41598-022-12240-2

5. Parvin Varmazyar, ... , **Joon-Gon Son,** "Calibration of micro-channel plate detector in a Thomson spectrometer for protons and carbon ions with energies below 1 MeV", **Review of Scientific Instruments**, 93, 073301 (2022)
https://doi.org/10.1063/5.0086747

6. **Joon-Gon Son**, Jung Won Choi, Okkyun Seo, Do Young Noh, Do-Kyeong Ko, "Morphology evolution of self-organized porous structures in silicon surface", **Results in Physics**, Vol.12, 46-51 (2019)
https://doi.org/10.1016/j.rinp.2018.11.006

7. **Joon-Gon Son**, Byung-Jun Hwang, Okkyun Seo, Jae Myung Kim, Do Young Noh, Do-Kyeong Ko, "A monochromatic soft x-ray generation from femtosecond laser-produced plasma with aluminum", **Journal of the Korean Physical Society,** Vol.73, 12, 1834-1839 (2018)
https://doi.org/10.3938/jkps.73.1834

8. **Joon-Gon Son**, Yonghoon Lee, Do-Kyeong Ko "Signal enhancement of laser-induced breakdown spectroscopy by applying synchronized buffer gas pulses". **Applied Physics Express**, 11. 102401 (2018)
https://doi.org/10.7567/APEX.11.102401

9. Abhishek Sahu, Manse Kim, Jooyeon Ryu, **Joon-Gon Son**, Eunji Lee, Do Young Noh, Giyoong Tae, "Nanographene oxide as a switch for CW/pulsed NIR laser triggered drug release from liposomes", **Materials Science and Engineering: C**, Vol. 82, 19-24 (2018)
https://doi.org/10.1016/j.msec.2017.08.057

10. Min Seong Kim, **JoonGon Son**, HyeongJin Lee, Heon Hwang, Chang Hyun Choi, GeunHyung Kim "Highly porous 3D nanofibrous scaffolds processed with an electrospinning/laser process", **Current Applied Physics**, Vol. 14, 1-7 (2014) – Co-first Author
https://doi.org/10.1016/j.cap.2013.10.008

11. M. Iqbal, Z. Urrehman, H. Im, **J. G. Son**, O. Seo, H. Stiel, P. V. Nickles, D. Y. Noh, K. A. Janulewicz, "Performance improvement of a Ka source by a high-resolution thin-layer-graphite spectrometer and a polycapillary lens", **Applied Physics B**, Vol. 116, 305-311 (2013)
https://doi.org/10.1007/s00340-013-5691-z

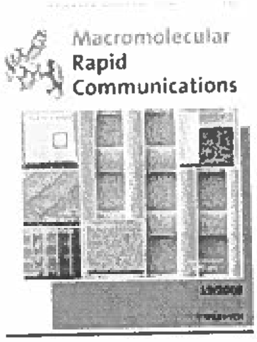
12. **Joon Gon Son**, Sung-Chul Choi, Myoung-Kyu Oh, Hoonsoo Kang, Hyyong Suk, Yonghoon Lee, "Application of pulsed buffer gas jets for the signal enhancement of laser-induced breakdown spectroscopy", **Applied Spectroscopy**, Vol.64, Issue 11, pp.1289-1297, (2010)
https://opg.optica.org/as/abstract.cfm?URI=as-64-11-1289

13. **Son, JoonGon**, Kim, GeunHyung, "Three-Dimensional Plotter Technology for Fabricating Polymeric Scaffolds with Micro-Grooved Surfaces", **Journal of Biomaterials Science**, Vol.20, pp 2089-2101, (2009)
https://doi.org/10.1163/156856208X399954

14. **JoonGon Son**, GeunHyung Kim, Su-A Park, WanDoo Kim, "Fabrication of tailor-made PCL scaffold using bio-plotter system", **Polymer** (Korea), Vol. 32, No. 2, pp.163-168, (2008)
https://koreascience.kr/article/JAKO200820549300118.page

15. GeunHyung Kim, **JoonGon Son**, SuA Park, WanDoo Kim, "Hybrid Process for Fabricating 3D Hierarchical Scaffolds Combining Rapid Prototyping and Electrospinning", **Macromolecular Rapid Communications**, Volume 29, Issue 19, pp.1577-1581, (2008), selected as cover page of the journal.
https://doi.org/10.1002/marc.200800277

Cover: The image shows a hybrid polymeric scaffold that was fabricated using a rapid prototyping (RP) method and electrospinning process. The panels clearly indicate that the layers of electrospun micro-/nanofibers are located between the layers of dispensed poly(ε-caprolactone) strands. Further details can be found in the article by G.-H. Kim,* J.-G. Son, S.-A. Park, and W.-D. Kim on page 1577.



16. GeunHyung Kim, **JoonGon Son**, "3D polycarprolactone(PCL) scaffold with hierarchical structure fabricated by a piezo electric transducer(PZT)-assisted bioplotter", **Applied Physics A** (Materials Science & Processing), Vol.94, No.4, pp.781-785, (2009)
https://doi.org/10.1007/s00339-008-4959-3

17. SuA Park, Koeun Park, Hyeon Yoon, **JoonGon Son**, Teijin Min and GeunHyungKim, "Review - Apparatus for preparing electrospun nano fibers: designing an electrospinning process for nano fiber fabrication", **Polymer (International)**, Volume 56, Number 11, pp. 1361-1366 (2007)
https://doi.org/10.1002/pi.2345

18. Geun Hyung Kim, Woo Jun Kim, Seung Mo Kim and **Joon Gon Son**, "Analysis of thermo-physical and optical properties of a diffuser using PET/PC/PBT copolymer in LCD backlight units", **Displays**, Volume 26, Issue 1, Pages 37-43, January (2005)
https://doi.org/10.1016/j.displa.2004.11.001

v. the list of other scientific papers and contributions: N/A