
Faiz Ahmed, Ph.D.

1 Cyclotron Rd, 70-127A, Lawrence Berkeley National Laboratory,
Berkeley, CA, USA

FAhmed@lbl.gov/faiz2310@gmail.com, +15103858130 (cell) 

Summary of Current Research Activity & Goal

- Development of Single Ion Conducting Polymer/Ceramic Composite Solid Electrolytes for High Density Li-Ion Batteries
- Development and electrochemical study of highly acidic fluoro-sulfonyl imide based electrolytes for battery applications.
- Synthesis of highly acidic imide based polymer electrolyte membranes for Fuel Cell.
- Development of a metal-organic framework for sensitive and non-enzymatic detection of glucose and hydrogen peroxide.
- Actively seeking a post-doctorate position in a competitive and dynamic environment where I would be able to utilize my research skills and can gain a positive foothold for my career.

Education

2016–2020 **Ph.D.**, Applied Chemistry (major), Department of Animal Bio and Applied Chemical Science, Konkuk University, Seoul, South Korea

CGPA 4.41 out of 4.50 scales

Thesis: “Design, synthesis, and electrochemical study of novel fluorosulfonyl imide based electrolytes for lithium-ion batteries.”

Research Advisor: Prof. Whan-Gi Kim

2011–2013 **M.S.**, Inorganic Chemistry, Department of Chemistry, Shahjalal University of Science and Technology, Sylhet, Bangladesh

CGPA 3.83 out of 4 scales

Thesis: “Spectroscopic investigations, anti-bacterial activities and DNA interactions of metal complexes (Cr (III), Zn (II), Ni (II)) containing phendione ligand”

Research Advisor: Prof. Md. Abdus Subhan

2007–2011 **B. Sc.**, Chemistry, Department of Chemistry, Shahjalal University of Science and Technology, Sylhet, Bangladesh

CGPA 3.51 out of 4 scales

Industrial Project: “In-plant Industrial project in Silco Pharmaceuticals Ltd, Sylhet, Bangladesh of science”

Advisor: Prof. Md. Anwar Hossain Khan

Work Experience & Training

2022~ Post-Doctoral Fellow, Lawrence Berkeley National Laboratory

Project Name: Development of Polymer/materials for High Energy Density Electric Storage Applications

The Energy Storage and Distributed Resources Division

Working with Dr. Gao Liu (Applied Energy Group)

- 2020-2021 Post-Doctoral Fellow, University Grenoble Alpes (UGA), LEPMI, CNRS, France
Project Name: Development of Single Ion Conducting Polymer/Ceramic Composite Solid Electrolytes for High Density Li-Ion Batteries
Project founder: Prof. Jean-Marie Tarascon (RS2E)
Working with Prof. Cristina Iojoiu and Prof. Fannie Alloin
- 2016–2018 Research Assistant, Konkuk University, South Korea
- 2014–2016 Assistant Teacher (Chemistry), Jalalabad Cantonment Public School and College (JCPSC), Sylhet, Bangladesh
- 2013 The training course on Chemical Analysis and Quality Control, Training Institute for Chemical Industries (TICI), Polash, Narsingdi, Bangladesh
Course duration: Four weeks, Result: A⁺
- 2012 In-plant Industrial Training in Silco Pharmaceuticals Ltd, Sylhet, Bangladesh
Course duration: Two weeks

Recognitions & Awards

- 2020 President award (for best Ph.D. thesis)
- 2016-2017 University Scholarship, Konkuk University, Seoul, South Korea
- 2016–2017 Graduate School Foreigner Scholarship
- 2016–2017 Research Assistant Scholarship
- 2016–2017 Foreigner Additional Scholarship
- 2012–2013 University Scholarship, Shahjalal University of Science and Technology, Sylhet

Publications (all papers can be seen through this link [Google](#))

- [34] W. Zhang, T. Ryu, S. Yoon, J. Lei, H. Lim, M. Jeon, W. Kim, **F. Ahmed**, H. Jang, Synthesis and characterization of gel polymer electrolyte based on epoxy group via cationic ring-open polymerization for lithium-ion battery, *Membranes* (2022), (IF 4.1) (Accepted)
- [33] W. Zhang, S. Yoon, J. Lei, H. Lim, M. Jeon, H. Jang, **F. Ahmed**, W. Kim, Lithium Salt Catalyzed Ring-Opening Polymerized Solid-State Electrolyte with Comparable Ionic Conductivity and Better Interface Compatibility for Li-Ion Batteries, *Membranes* (2022), (IF 4.1) [Link]
- [32] **F. Ahmed**, D. Kim, J. Lei, T. Ryu, S. Yoon, W. Zhang, H. Lim, G. Jang, H. Jang, W. Kim, UV Cured Cross-linked Astounding Conductive Polymer Electrolyte for Safe and High-Performance Li-ion Batteries, *ACS Applied Materials and Interfaces* (2021), (IF 9.22) [Link]
- [31] L. Jin, Y. Lee, D. Kim, **F. Ahmed**, T. Ryu, W. Kim, H. Jang, Comparative study of chemically different structured sulfonic acid and sulfonimide acid of Poly (isatine-phenylene) electrolyte for PEMFC, *Int. J. Hydrogen Energy* (2021), (IF 4.94) [Link]
- [30] H.R. Barai, N.S. Lopa, **F. Ahmed**, N.A. Khan, S.A. Ansari, S.W. Joo, M.M. Rahman, Solution process

synthesis of Cu-doped Mn₃O₄@Mn-doped CuO nanostructured electrode materials for high-performance electrochemical pseudocapacitors, *ACS Omega* 35 (2020) 22356-22366, (IF 2.87) [\[Link\]](#)

[29] S. Yoon, **F. Ahmed**, W. Zhang, T. Ryu, L. Jin, D. Kim, W. Kim, H. Jang, Flexible blend polymer electrolyte membranes with excellent conductivity for fuel cells, *Int. J. Hydrogen Energy* (2020), (IF 4.94) **(Co-first author)** [\[Link\]](#)

[28] M.M. Rahman, S.C. Sutradhar, **F. Ahmed**, T. Ryu, S. Yoon, H. Jang, W. Zhang, D. Kim, W. Kim, Highly proton conductive sulfonyl imide based polymer blended from poly(arylene ether sulfone) and parmax-1200 for fuel cells, *J. Nanosci. Nanotechnol.* 21 (2020) 1845-1853, (IF 1.13) [\[Link\]](#)

[27] **F. Ahmed**, I. Choi, T. Ryu, S. Yoon, M.M. Rahman, W. Zhang, H. Jang, W. Kim, Highly conductive divalent fluorosulfonyl imide based electrolytes improving Li-ion battery performance: additive potentiating electrolytes action, *J. Power Sources* 455 (2020) 277980, (IF 9.125) [\[Link\]](#)

[26] W. Zhang, M.M. Rahman, **F. Ahmed**, N.S. Lopa, C. Ge, T. Ryu, S. Yoon, L. Jin, H. Jang, W. Kim, A Two-step Approach for Improved Exfoliation and Cutting of Boron Nitride into Boron Nitride Nanodisks with Covalent Functionalizations, *Nanotechnology* 31 (2020) 425604, (IF 3.87) [\[Link\]](#)

[25] L. Jin, **F. Ahmed**, T. Ryu, S. Yoon, W. Zhang, Y. Lee, D. Kim, H. Jang, W. Kim, Highly conductive and flexible gel polymer electrolyte with bis(fluorosulfonyl)imide lithium salt via UV-curing for Li-ion batteries, *Membranes* 9 (2019) 139, (IF 4.1) [\[Link\]](#)

[24] S.C. Sutradhar, M.M. Rahman, **F. Ahmed**, T. Ryu, J. Lei, S. Yoon, S. Lee, Y. Jin, W. Kim, Improved proton conductive membranes from poly(phenylenebenzophenone)s with pendant sulfonyl imide acid groups for fuel cells, *J. Power Sources* 442 (2019) 227233, (IF 9.12) [\[Link\]](#)

[23] **F. Ahmed**, I. Choi, M.M. Rahman, H. Jang, T. Ryu, S. Yoon, J. Lee, W. Kim, Remarkable conductivity of a self-healing single-ion conducting polymer electrolyte, poly (ethylene-co-acrylic lithium (fluoro sulfonyl)imide), for all-solid-state Li-ion batteries, *ACS Appl. Mater. Interfaces* 38 (2019) 34930-34938, (IF 9.22) [\[Link\]](#)

[22] **F. Ahmed**, M.M. Rahman, S.C. Sutradhar, N.S. Lopa, T. Ryu, S. Yoon, I. Choi, J. Kim, Y. Jin, W. Kim, Synthesis of an imidazolium functionalized imide based electrolyte salt and its electrochemical performance enhancement with additives in Li-ion batteries, *J. Ind. Eng. Chem.* 78 (2019) 178-185, (IF 5.95) [\[Link\]](#)

[21] S.C. Sutradhar, M.M. Rahman, **F. Ahmed**, T. Ryu, S. Yoon, S. Lee, J. Kim, Y. Lee, Y. Jin, W. Kim, Thermally and chemically stable poly(phenylenebenzophenone) membranes for proton exchange membrane fuel cells by Ni (0) catalyst, *J. Ind. Eng. Chem.* 76 (2019) 233-239, (IF 5.95) [\[Link\]](#)

[20] N.S. Lopa, M.M. Rahman, **F. Ahmed**, T. Ryu, J. Lei, I. Choi, D.H. Kim, Y.H. Lee, W. Kim, A chemically and electrochemically stable, redox-active and highly sensitive metal azolate framework for non-enzymatic electrochemical detection of glucose, *J. Electroanal. Chem.* 840 (2019) 263-271, (IF 4.46)

[\[Link\]](#)

[19] S.C. Sutradhar, M.M. Rahman, **F. Ahmed**, T. Ryu, S. Yoon, S. Lee, J. Kim, Y. Lee, Y. Jin, W. Kim, Synthesis of nickel catalyzed sulfonated poly (phenylenebenzophenone)s from primarily sulfonated monomer for proton exchange membranes, *Int. J. Hydrogen Energy* 44 (2019) 11311-11320, (IF 4.94)

[\[Link\]](#)

[18] S. Yoon, T. Ryu, K. Kim, S.S. Chandra, **F. Ahmed**, H. Yang, S. Lee, J. Kim, W. Kim, Synthesis of sulfonation poly(N-propylsulfonicacid isatin biphenylene) for polymer electrolyte membrane fuel cell containing SiO₂ nanocomposite membrane, *J. Nanosci. Nanotechnol.* 19 (2019) 1562-1566, (IF 1.13)

[\[Link\]](#)

[17] S. C. Sutradhar, **F. Ahmed**, T. Ryu, S. Yoon, S. Lee, M. M. Rahman, J. Kim, Y. Lee, W. Kim, Y. Jin, A novel synthesis approach to partially fluorinated sulfonimide based poly (arylene ether sulfone) s for proton exchange membrane, *Int. J. Hydrogen Energy* 44 (2019) 11321-11331, (IF 4.94) [\[Link\]](#)

[16] **F. Ahmed**, M.M. Rahman, S.C. Sutradhar, N.S. Lopa, T. Ryu, S. Yoon, I. Choi, Y. Lee, W. Kim, Synthesis and electrochemical performance of an imidazolium based Li salt as electrolyte with Li fluorinated sulfonylimides as additives for Li-Ion batteries, *Electrochim. Acta* 302 (2019) 161-168, (IF 6.90) [\[Link\]](#)

[15] S.C. Sutradhar, **F. Ahmed**, T. Ryu, J. Lei, S. Yoon, I. Choi, D. Kim, Y. Jin, W. Kim, Bisphenol A based carbon-carbon coupled poly(arylene)s from dibenzoyl-dichlorobenzene via Ni(II) catalyzed and condensation polymerization for PEMFC, *Int. J. Hydrogen Energy* 44 (2019) 21090-21100, (IF 5.81)

[\[Link\]](#)

[14] **F. Ahmed**, M.M. Rahman, S.C. Sutradhar, N.S. Lopa, T. Ryu, S. Yoon, I. Choi, S. Lee, W. Kim, Novel divalent organo-lithium salts with high electrochemical and thermal stability for aqueous rechargeable Li-ion batteries, *Electrochim. Acta* 298 (2019) 709-716, (IF 6.90) [\[Link\]](#)

[13] N.S. Lopa, M.M. Rahman, **F. Ahmed**, T. Ryu, S.C. Sutradhar, J. Lei, J. Kim, D.H. Kim, Y.H. Lee, W. Kim, Simple, low-cost, sensitive and label-free aptasensor for the detection of cardiac troponin I based on a gold nanoparticles modified titanium foil, *Biosens. Bioelectron* 126 (2019) 381-388, (IF 10.62) [\[Link\]](#)

[12] T. Ryu, **F. Ahmed**, S.C. Sutradhar, N.S. Lopa, H. Yang, S. Yoon, S. Lee, I. Choi, W. Kim, Synthesis and characterization of block copolymer and comparative study with random copolymer via superacid catalyzed reaction, *Int. J. Hydrogen Energy* 43 (2018) 11862-11871, (IF 5.81) [\[Link\]](#) (Co-first author)

[11] N.S. Lopa, M.M. Rahman, **F. Ahmed**, S.C. Sutradhar, T. Ryu, W. Kim, A Ni-based redox-active metal-organic framework for sensitive and non-enzymatic detection of glucose, *J. Electroanal. Chem.* 822 (2018) 43-49, (IF 4.46) [\[Link\]](#)

[10] N.S. Lopa, M.M. Rahman, **F. Ahmed**, S.C. Sutradhar, T. Ryu, W. Kim, A base-stable metal-organic framework for sensitive and non-enzymatic electrochemical detection of hydrogen peroxide, *Electrochim.*

Acta 274 (2018) 49-56, (IF 6.90) [\[Link\]](#)

[9] T. Ryu, S.S. Chandra, **F. Ahmed**, N.S. Lopa, S. Yoon, H. Yang, S. Lee, I. Choi, W. Kim, Synthesis and characterization of fluorosulfonyl imide isatin biphenylene block copolymer for PEMFC, *Int. J. Hydrogen Energy 43 (2018) 11803-11810*, (IF 5.81) [\[Link\]](#)

[8] T. Ryu, H. Jang, **F. Ahmed**, N.S. Lopa, H. Yang, S. Yoon, I. Choi, W. Kim, Synthesis and characterization of polymer electrolyte membrane containing methylisatin moiety by polyhydroalkylation for fuel cell, *Int. J. Hydrogen Energy 43 (2018) 5398-5404*, (IF 5.81) [\[Link\]](#)

[7] N.S. Lopa, M.M. Rahman, H. Jang, S.C. Sutradhar, **F. Ahmed**, T. Ryu, W. Kim, A glassy carbon electrode modified with poly(2,4-dinitrophenylhydrazine) for simultaneous detection of dihydroxybenzene isomers, *Microchim. Acta 23 (2018) 185*, (IF 6.23) [\[Link\]](#)

[6] H. Jang, **F. Ahmed**, H. Joo, T. Ryu, H. Yang, S. Yoon, W. Kim, H.-S. Jeon, Polycarbonate-Co-PMMA block copolymers via atom transfer radical polymerization reaction, *J. Nanosci. Nanotechnol. 17 (2017) 7381-7386*, (IF 1.13) [\[Link\]](#)

[5] **F. Ahmed**, S.C. Sutradhar, T. Ryu, H. Jang, K. Choi, H. Yang, S. Yoon, M.M. Rahman, W. Kim, Comparative study of sulfonated branched and linear poly(phenylene)s polymer electrolyte membranes for fuel cells, *Int J Hydrogen Energy 43 (2018) 5374-5385*, (IF 5.81) [\[Link\]](#)

[4] H. Jang, T. Ryu, S.C. Sutradhar, **F. Ahmed**, K. Choi, H. Yang, S. Yoon, W. Kim, Studies of sulfonated poly(phenylene)-block-poly(ethersulfone) for proton exchange membrane fuel cell, *Int. J. Hydrogen Energy 42 (2017) 12768-12776*, (IF 5.81) [\[Link\]](#)

[3] T. Ryu, S.C. Sutradhar, **F. Ahmed**, K. Choi, H. Yang, S. Yoon, S. Lee, W. Kim, Synthesis and characterization of sulfonated mutiphenyl conjugated polyimide for PEMFC, *J. Ind. Eng. Chem. 49 (2017) 99-104*, (IF 5.95) [\[Link\]](#)

[2] H. Jang, M.A. Hossain, S.C. Sutradhar, **F. Ahmed**, K. Choi, T. Ryu, K. Kim, W. Kim, Anion conductive tetra-sulfonium hydroxides poly(fluorenylene ether sulfone) membrane for fuel cell application, *Int. J. Hydrogen Energy 42 (2016) 12759-12767*, (IF 5.81) [\[Link\]](#)

[1] M.A. Subhan, **F. Ahmed**, M.S. Rahaman, A.K. Azad, K. Begum, Spectroscopic investigations, anti-bacterial activities and DNA-interactions of metal complexes (Cr (III), Zn (II), Ni (II)) containing phendione ligand, *J. Sci. Research 7 (2015) 113-128*, (IF N/A) [\[Link\]](#)

Conference Proceeding

[1] S.C. Sutradhar, **F. Ahmed**, N.S. Lopa, T. Ryu, H. Yang, S. Yoon, S. Lee, I. Choi, W. Kim, Synthesis and characterization of sulfonylimide based poly (arylene ether sulfone) copolymers for proton-exchange membrane, *IEEE, 9th International Renewable Energy Congress (IREC) (Tunisia), 2018*, [\[Link\]](#)

[2] S.C. Sutradhar, T. Ryu, **F. Ahmed**, S. Yoon, W. Zhang, H. Jang, W. Kim, Sulfonyl imide-based poly(benzophenone)s fuel cell membranes via nicake catalyzed polymerization, *IEEE, 11th International Renewable Energy Congress (IREC) (Tunisia), 2020*, [\[Link\]](#)

Patents (all patents are Korean)

- [7] “PEALiFSI polymer compound, process for preparing the same and use as solid electrolyte thereof,” Registration No.(Date) 1021885580000 (2020.12.02)
- [6] “Imidazolium functionalized imide-based lithium salt, process for preparing the same and electrolyte composition for Li-ion battery comprising the same,” Patent Number: P190410, 2019, Application No.(Date) 1020190058632 (2019.05.20), Examination Status: Decision to grant (General) (available in online)
- [5] “Imidazolium based Li salt, process for the synthesis thereof and electrolyte composition comprising the same,” Registration No.(Date) 1021952570000 (2020.12.18)
- [4] “Electrolyte for Aqueous Rechargeable Lithium-Ion Battery, and Aqueous Rechargeable Lithium Ion Battery Comprising the Same,” Registration No.(Date) 1021352180000 (2020.07.13)
- [3] “Sulfonimide based poly(phenylene benzophenone) polymer for proton exchange membrane fuel and process for preparing the same by carbon-carbon coupling polymerization,” Registration No.(Date) 1021952580000 (2020.12.18)
- [2] “Novel polymer comprising partially fluorinated sulfonimide, process for the preparation thereof and proton exchange membrane comprising the same,” Registration No.(Date) 1021425660000 (2020.08.03)
- [1] “Branched sulfonated polyphenylene polymer and polymer electrolyte membrane for fuel cell comprising the same,” Registration No.(Date) 1017984990000 (2017.11.10)

Conference attendant

- [16] “Synthesis and property of poly(flurosulfonyl maleimide-styrene)s by free radical reaction for polymer electrolyte membrane fuel cell (PEMFC)” The 5th international conference on advanced electronic materials, November 5-8, **2019**, Ramada plaza hotel, Jeju, **South Korea** (poster presentation, poster ID: 06-0738)
- [15] “Novel non-aqueous electrolytes and enhancement of its electrochemical performances by using sulfonyl imide as additives for Li-ion battery” 25th topical meeting of the international society of electrochemistry, May 12-15, **2019**, Toledo, **Spain** (poster presentation, poster ID: S4-001)
- [14] “UV-cured novel polymer electrolyte directly pendant lithium fluorosulfonylimide (LiFSI) for Li-ion batteries” 25th topical meeting of the international society of electrochemistry, May 12-15, **2019**, Toledo, **Spain** (poster presentation, poster ID: S4-002)
- [13] “Fluoro sulfonylimide acryl polymer lithium-ion electrolyte” The polymer society of Korea, annual spring meeting, April 10-12, **2019**, BEXCO, Busan, **South Korea** (poster presentation, poster ID: 1PS-82)
- [12] “Synthesis of solid polymer electrolytes poly(malesulfoneimide)s containing flurosulfonyl group for

lithium-ion batteries by UV-curing” The polymer society of Korea, annual fall meeting, October 10-12, **2018**, Hwabaek International Convention Center (HICO), Gyeongju, **South Korea**, (poster presentation, poster ID: 2PS-140)

[11] “Synthesis of monomer and characterization of polycarbonate to increase T_g and thermal stability” The 5th international conference on electronic materials and nanotechnology for green environment, November 11-14, **2018**, Ramada plaza hotel, Jeju, **South Korea** (poster presentation, poster ID: 13-1-2651)

[10] “Novel non-aqueous organic electrolytes with high ionic conductivity for rechargeable Li-ion battery” The European materials research society (E-MRS) fall meeting, September 17-20, **2018**, Central Campus of Warshow University of Technology, Warsaw, **Poland** (oral presentation)

[09] “Proton exchange polymer membranes containing sulfonated poly(phenylene)s moiety without ether linkage” HYPOTHESIS XIII hydrogen power theoretical and engineering solutions international symposium, July 24-27, **2018** – **Singapore** (oral presentation, ID:162)

[08] “Synthesis of sulfonated poly (phenylenebenzophenone)s from primarily sulfonated monomer for proton exchange membranes” HYPOTHESIS XIII hydrogen power theoretical and engineering solutions international symposium, July 24-27, **2018** – **Singapore** (oral presentation, ID:163)

[07] “Synthesis and characterization of poly(malesulfoneimide)s containing fluorsulfonyl group for PEMFC by UV-curing” The 16th international symposium on polymer electrolytes (ISPE 16), June 24-29, **2018**, Yokohama, **Japan**. (poster presentation, poster ID: P2-30)

[06] “Synthesis and characterization of organo-lithium salts with high electrochemical and thermal stability for aqueous rechargeable Li-ion batteries” The polymer society of Korea, annual spring meeting, April 04-06, **2018**, Daejeon, **South Korea**, (poster presentation, poster ID: 1PS-68)

[05] “Synthesis and characterization of UV-cured methacrylic type membranes as gel-polymer electrolyte for Li-ion batteries” The polymer society of Korea, annual fall meeting, October 10 to 13, **2017**, ICC, Jeju, **South Korea**. (poster presentation, poster ID: 1 PS-58)

[04] “Synthesis and investigation of sulfonated polymers and the effects of branching on polymers as proton exchange membranes” the polymer society of Korea, annual spring meeting, April 05 to 07, **2017**, Daejeon, **South Korea**. (poster presentation, poster ID: I PS-66)

[03] “Synthesis and characterization of block poly(isatin biphenylene-co-dihydroxyphenylene) with sulfonyl imide for PEMFC” the 8th international renewable energy congress “IREC 2017” organized on March 21st to 23rd, **2017**, in Amman- **Jordan**. (oral presentation, poster ID: 092)

[02] “Synthesis and characterization of pendant sulfonated isatin block copolymer via superacid-catalyzed reaction” the 8th international renewable energy congress “IREC 2017” organized on March 21st to 23rd, **2017**, in Amman- **Jordan**. (poster presentation, poster ID: 093)

[01] “Comparison of linear and branched sulfonated poly(phenylene) PEMFC” IUPAC-PSK 40, IUPAC

international conference on advanced polymeric materials, October 04 to 07, **2016**, ICC, Jeju, **South Korea**.
(poster presentation, poster ID: 1PS-24)

Academic & Social Activities

2021~ Topic Editor, Membranes, MDPI
2020 ~ Reviewer (Elsevier, De Gruyter)
2019 ~ Member, International Society of Electrochemistry (ISE)
2016 ~ Member, Polymer Society of Korea (PSK)
2016 ~ Member, Korean Chemical Society (KCS)
2007 ~ Member, Chemistry Society of SUST

Techniques, Software & Instrumentations

- Electrolyte synthesis via different polymerization reactions, such as Ni-catalyzed, super-acid, condensation, UV-curing, Free radical, and In-situ polymerization reactions.
- Electrochemical techniques: CV, LSV, EIS, chronoamperometry, chronopotentiometry, MEA, Fuel cell, battery preparation, and measurement, etc.
- Surface characterization techniques, e.g., FE-SEM, TEM, EDS, XRD, XPS, AFM, etc.
- Hands-on expertise in different organic monomer and polymer synthesis.
- Analytical techniques: FTIR, UV-visible, DSC, NMR, TGA, etc.
- Software: EC lab, Zview, MS Office, Origin, ImageJ, etc.