**SAMIRA MAHMUD**

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**EDUCATION**

**University of Dhaka** *Dhaka, Bangladesh*

**Department of Chemistry** [*https://www.du.ac.bd/academic/department\_item/CHM*](https://www.du.ac.bd/academic/department_item/CHM)

***Master of Science in Physical Chemistry***  **GPA: *3.82/4.00***  *June 2018*

* Class Rank: 2/25
* Relevant Coursework: Chemistry of Materials, Supramolecular and Nano-chemistry, Advanced Electrochemistry and Electrochemical Techniques, Advanced Photochemistry, Molecular Symmetry and Advanced Spectroscopy, Chemistry of Atmospheric Environment

***Bachelor of Science with Honours in Chemistry***   **GPA: *3.48/4.00***  *October 2016*

* Class Rank: 11/92
* Relevant Coursework: Physical Properties of Polymers, Chemistry of Solids, Elements of Chemical Crystallography, Nuclear Chemistry, Chemical Kinetics and Photochemistry, Transition Metals and Co-ordination Chemistry, Instrumental Methods of Analysis, Surface Chemistry, Colloid Science & Phase Equilibria, Chemical Spectroscopy, Quantum Chemistry and Statistical Mechanics, Chemistry of the Representative Elements

**RESEARCH & WORK EXPERIENCE**

**University of Dhaka, Department of Chemistry** *Dhaka, Bangladesh*

**Material Chemistry Research Laboratory**  *www.matchemdu.edu.bd*

***Undergraduate Researcher*** *May 2015 – October 2016*

**Fields:** Supramolecular Chemistry, Material Chemistry, Nanotechnology & Nanochemistry

**Undergraduate Project:** “***Plasmonic Properties of Bimetallic Plasmonic Au@Ag Core@shell Nanoparticles Synthesized in Reverse Microemulsion Based Nanoreactors***”

* Designed and developed Triton X-100/cyclohexane/water/hexanol-1 based water-in-oil microemulsions for exploiting as versatile nanoreactors
* Synthesized Au, Ag and Au@Ag core@shell nanoparticles using Triton X-100 based water-in-oil microemulsions as nanoreactors
* Characterized the synthesized Au, Au and Au@Ag core@shell nanoparticles using several analytical techniques and confirmed the formation of Au, Ag and Au@Ag core@shell nanoparticles

***Master’s Researcher*** *November 2016 – June 2018*

**Fields:** Nano-plasmonics, Nano-photoluminescence, Nano-optics

**Master’s Thesis:** “***Nanoengineering of Bimetallic Plasmonic and Photoluminescent Au@Ag Core@shell Nanoparticles***”

* Identified and described unique plasmonic phenomenon of Au@Ag core@shell nanoparticles by UV-Visible spectroscopy
* Identified the higher order plasmonic modes (dipole, quadrupole, octupole) in Au@Ag core@shell nanoparticles by de-convolution method and correlated with the plasmon hybridization model for providing theoretical explanation of the emergence of the higher order plasmonic modes
* Analyzed and described the plasmon enhanced photoluminescence (fluorescence and phosphorescence) and time resolved photoluminescence (fluorescence and phosphorescence) phenomenon of Au@Ag core@shell nanoparticles by fluorescence spectroscopy
* Performed statistical analysis on data sets using Sigmaplot 11.0 to determine the fluorescence and phosphorescence enhancement in Au@Ag core@shell nanoparticles

***Research Assistant*** *July 2015 – June 2017*

**Project Title:** “***Synthesis of Metal@metal Core@shell Plasmonic Nanoparticles in Reverse Microemulsion for Optoelectronics and Biomedical Applications***”

* Initiated, designed strategies and executed independent experiments for the synthesis of Fe@Au and Au@Ag core@shell nanoparticles
* Characterized the synthesized nanoparticles and analyzed their optical, plasmonic and photoluminescence properties
* Optimized the properties of the synthesized core@shell nanoparticles for exploiting them in potential applications
* Provided research support, case writing and data analysis, completed the project with proper progress and timely drafted the final project reports

***Research Fellow*** *July 2017 – June 2018*

**National Institute of Science & Technology, Ministry of Science and Technology of Bangladesh** *Dhaka, Bangladesh*

**Project Title:** “***Plasmonic and Photoluminescence Properties of Bimetallic Plasmonic and Fluorescent Au@Ag Core@shell Nanoparticles***”

* Developed strategies and directed experiments for the synthesis of Au@Ag core@shell nanoparticles
* Analyzed the synthesized nanoparticles and explored their captivating plasmonic and fluorescent properties
* Outlined and drafted the project project proposal, ensured proper review and, drafted and submitted the final project report

***Lab Manager*** *November 2015 – June 2018*

* Monitored and coordinated the routine maintenance of the analytical instruments of the laboratory
* Demonstrated and helped to understand the principal of the analytical instruments to other researchers of the laboratory
* Mentored 2 undergraduate students and helped 1 doctoral student in their research projects over 1.5 years
* Established and promoted collaboration with 3 national and 2 international research groups by providing analytical services
* Drafted research grant proposals and explained the activity of the lab to administrative persons during the lab survey process

**Daffodil International University** *Dhaka, Bangladesh*

**Department of General Education Development** [*www.daffodilvarsity.edu.bd*](http://www.daffodilvarsity.edu.bd)

***Lecturer in Chemistry*** *September 2019 – Present*

**Courses Conducted:** Chemistry I, Chemistry II, Textile & Environment

* Designed and delivered weekly lectures and led weekly discussion sessions for group of 140 undergraduate students of Faculty of Engineering
* Designed course materials including study problems, homeworks and made the questions of quizzes and final exams
* Graded problem sets, quizzes, final exams, written assignments and oral presentations

**LEADERSHIP EXPERIENCE**

**University of Dhaka, Department of Chemistry** *Dhaka, Bangladesh*

**Material Chemistry Research Laboratory** [*www.matchemdu.edu.bd*](http://www.matchemdu.edu.bd/)

***Weekly Research Seminar Moderator & Co-ordinator*** *November 2016 – December 2017*

* Planned and made the weekly seminar schedule and, helped to organize the weekly seminar
* Leaded weekly seminar sessions and, helped the young researchers on making and delivering their powerpoint presentations

***Planner & Organizer of Research Seminar Camp***  *December 2017*

* Planned and arranged the research seminar camp, organized and executed the conference, designed and prepared the conference booklet, monitored the arrangement and activity of the conference

**University of Dhaka, Department of Chemistry** *Dhaka, Bangladesh*

***Volunteer, Bangladesh Chemistry Olympiad***  *January 2017*

* Helped to arrange and organize the Olympiad, helped to display the scientific experiments at the Olympiad and demonstrated a presentation on ‘Introduction to Nanomaterials’ to motivate the young students

***Presenter & Organizer, Official Orientation Program***  *May 2014*

* Planned and organized the official orientation program for the new students of Department of Chemistry and anchored the whole session

**PUBLICATION**

“***Tailored Engineering of Bimetallic Plasmonic Au@Ag Core@shell Nanoparticles***” - Samira Mahmud, Shazia Sharmin Satter, Ajaya Kumar Singh, M. Muhibur Rahman, M. Yousuf A. Mollah, Md. Abu Bin Hasan Susan\* (***ACS Omega***)

<https://pubs.acs.org/doi/10.1021/acsomega.9b01897>

**STANDARDIZED TESTS**

***Graduate Record Examination (GRE)*** *October 2018*

**Score:** ***308***  **Quant:** ***163*** (83rd Percentile) || **Verbal:** ***145*** (27th Percentile) || **AWA:** ***3.5*** (41st Percentile)

***TOEFL iBT*** *November 2018*

**Score:** ***91***  **Reading:** ***24*** || **Listening:** ***19*** || **Speaking:** ***25*** || **Writing:** ***23***

**AWARDS & SCHOLARSHIP**

**1.** ***Bangladesh Government Scholarship (2017-18)*** from the Department of Higher Education of Government of Bangladesh for the outstanding performance of the Bachelor of Science (Chemistry) held in 2016

**2.** ***Research Fellowship*** ***(2017-18)*** from National Institute of Science & Technology of the Ministry of Science and Technology of Bangladesh

**SKILLS**

**Computer:** Microsoft Office (Word | Powerpoint | Excel), Adobe Illustrator, Adobe Photoshop, Windows

Laboratory **Instrument Handling / Data Analysis**: UV-Visible Spectrophotometry, Photoluminescence Spectrophotometry, X-Ray Photoelectron Spectrometry, Scanning Electron Microscopy (SEM), Field Emission Scanning Electron Microscopy (FESEM), High Resolution Transmission Electron Microscopy (HRTEM), Energy Dispersive X-Ray Spectrometry, Powder X-Ray Diffractometry, Zeta Potential, Photon Correlation Spectrometry / Dynamic Light Scattering

**Data Analysis Software:** Sigmaplot 10.0, Sigmaplot 11.0, Absorption Emission (ae), AntiFit, DecayFit, Fityk, CasaXPS, XPSPeak4.1, Powder X

**Language:** Fluent in English, Bangla, Hindi and good in Arabic

**CONFERENCES & PRESENTATIONS**

**1.** Oralpresentation on “***Reverse Microemulsion Based Nanoreactors for Synthesis of Bimetallic Plasmonic Core@shell Nanoparticles with Tunable Optical Properties***” (S. Mahmud1, M. Y. A. Mollah2, M. A. B. H. Susan1\*) presented at the 16th Asian Chemical Congress held on March 16-19, 2016 at BUET, Dhaka, Bangladesh

**2.** Poster presentation on “***Plasmonic Properties of Bimetallic Plasmonic Au@Ag Core@shell Nanoparticles Synthesized in Reverse Microemulsion Based Nanoreactors***” (S. Mahmud1, M. Y. A. Mollah2, M. A. B. H. Susan1\*) presented at the 1st Symposium on Chemistry for Global Solidarity held on October 14, 2016 at Jagannath University, Dhaka, Bangladesh

**3.** Oral presentation on “***Plasmonic Properties of Bimetallic Plasmonic Au@Ag Core@shell Nanoparticles Synthesized in Reverse Microemulsion Based Nanoreactors***” (S. Mahmud1, M. Y. A. Mollah2, M. A. B. H. Susan1\*) presented at the 3rd Conference of Bangladesh Crystallographic Association held on December 1-2, 2016 at Bangladesh Atomic Energy Commission, Dhaka, Bangladesh

**4.** Poster presentation on “***Ultimate Step Towards A Tailored Engineering of Plasmonic and Fluorescent Au@Ag Core@shell Nanoparticles***” (S. Mahmud1, M. Y. A. Mollah2, M. A. B. H. Susan1\*) presented at the International Conference On Genomics, Nanotech & Bioengineering held on May 14-16, 2017 at North South University, Dhaka, Bangladesh

* Achieved the **Best Poster Award** for the poster presentation at the conference

**5.** Oral Presentation on “***Au@Ag Core@shell Nanoparticles: A Catchphrase of Nanoplasmonics from Sensing to Waveguiding***” (S. Mahmud1, M. Y. A. Mollah2, M. A. B. H. Susan1\*) presented at the International Conference On Nanotechnology and Condensed Matter Physics 2018 held on January 11-12, 2018 at BUET, Dhaka, Bangladesh