# TAHMID HASSAN TALUKDAR

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## EDUCATION

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| *Aug 2017 – present* | ***Clemson University**, Clemson, SC*<br>Ph.D. Student in Electrical Engineering (3rd year)<br>Thesis: "TBD" \| Advisor: Dr. Judson D. Ryckman<br>GPA: 4.00/4.00 |
| *Dec 2019* | ***Clemson University**, Clemson, SC*<br>MS in Electrical Engineering<br>Thesis: "Porous silicon photonics at unity confinement factors for surface adlayer biosensing"<br>GPA: 4.00/4.00 |
| *Mar 2016* | ***Shahjalal University of Science and Technology**, Sylhet, Bangladesh*<br>B.Sc. in Electrical & Electronic Engineering<br>Thesis: "High Efficiency Multijunction Solar Cells"<br>Class rank: 5th |

## EXPERIENCE

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| *Aug 2017 – present* | ***Nanophotonics Lab,** Clemson University, SC*<br>*Graduate Research Assistant*<br>Design and implementation of nanophotonic waveguides, biological and chemical sensors, photonic cavities and resonators. I am also gaining proficiency in fabrication of silicon optical devices. |
| *Feb 2017 – Aug 2017* | **Sylhet Engineering College,** Sylhet, Bangladesh<br>*Lecturer*<br>Performing class lectures, conducting labs, setting assignments and exams (Circuits I and II). Graded Electrical Technology, Circuits II and Electrical Drives and Instrumentation. |

## SKILLS

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| *Programming:* | Python, MATLAB, C, Assembly, HTML-CSS, LATEX, Image Processing (MATLAB, OpenCV), Machine Learning (MATLAB, Scikit-learn, Tensorflow) |
| *Optics:* | Edge coupled waveguide interferometer setups – data measurement and analysis, Thin film analyzers (F40), SEM, 3D optical profilometry (Veeco) |
| *Cleanroom Skills:* | Regular visits to *Oak Ridge National Lab* has bolstered my cleanroom skills. Notable skills include: *GDSII* Layout Design, Photolithography, Electron Beam Lithography (JEOL JBX-9300FS), Grayscale Lithography, ICP-RIE Etcher (Oxford PlasmaTherm), Dry Etch- Wet KOH Etch, Profilometry (Tencor), Reflectometry |
| *Circuits:* | Embedded Systems, Filters, Sensors, Oscilloscope, Signal Generator, Soldering, Microcontrollers (Arduino MEGA, UNO), Atmel AVR Atmega8, Atmega16 |

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| *Instrumentation:* | HF Electrochemical Etch, KOH Wet etch, Scanning Electron Microscopy (SEM), Atomic Force Microscopy (AFM), Thin Film Analyzers (Filmetrics F40), Hydraulic press for imprinting, Evaporator (Cr, Pt) |
| *Software:* | MATLAB, KLayout, Lumerical MODE – FDTD – Interconnect, Orcad (Spice, Capture and Layout), Simulink, COMSOL, LTSpice IV, AutoCAD, Beamer |

## PUBLICATIONS

1. <u>Tahmid H. Talukdar</u>, Gabriel D. Allen, Ivan Kravchenko, and Judson D. Ryckman, "Single-mode porous silicon waveguide interferometers with unity confinement factors for ultra-sensitive surface adlayer sensing," Opt. Express 27, 22485-22498 (2019)

## SELECTED CONFERENCE PROCEEDINGS

1. Tahmid Hassan Talukdar, Ivan Kravchenko, Judson D. Ryckman, "High figure of merit interferometric sensors: exceeding the sensitivity of bulk porous silicon via waveguide dispersion", in Porous Semiconductors Science and Technology (PSST) 2020

2. Tahmid Hassan Talukdar, Bria McCoy, Sarah Timmins, Taufiquar Khan, Judson D. Ryckman, "Hyperchromatic structural color: perceptually enhanced biosensing by the naked eye or smartphone", in Porous Semiconductors Science and Technology (PSST) 2020

3. Julius Perez, Tahmid Hassan Talukdar, Judson D. Ryckman, "Nanoimprinting refractive index using mesoporous silicon substrates", in Porous Semiconductors Science and Technology (PSST) 2020

4. T.H. Talukdar, S. H. Parvez, "Small Scale Data Transmission via Light," in International Conference on Engineering, Research, Innovation and Education, Sylhet, Bangladesh, Jan 2017.

5. T.H. Talukdar, R. Siddique, and M. Hasan, "Study of Single Junction Solar Cell Characteristics Varying Different Parameters," in the 2nd International Conference on Electrical Engineering and Information & Communication Technology, Dhaka, Bangladesh, May 2015.

## CURRENT PROJECTS

1. Unity-confinement porous silicon and porous silica waveguide interferometers for surface adlayer biosensing.
2. Metasurface-based flat optics by direct imprinting of refractive index on porous substrates through grayscale electron beam lithography.
3. Employing polarization mode dispersion due to birefringence in porous silicon waveguides for biosensing applications.
4. Hyperchromatic porous silicon structural color sensors.
5. Dispersion based sensitivity enhancement in porous silicon multilayer rib waveguides.
6. Dispersion enhanced porous silicon meta-pillars for surface adlayer biosensing.