UNC Charlotte – Lee College of Engineering Senior Design Program
<u>Company Information</u>

Company Name	*University of North Carolina at Charlotte*	Date Submitted	*12/10/2020*
Project Title	*Quantitative Electroluminescence (QEL)* **(UNCC_ECE_QEL)**	**Planned Starting Semester**	Spring 21 & Fall 2021

Funding:

This Project will be funded from Dr. Ebong's PV Research Lab; students will be using his lab and the equipment in it. If additional materials is needed the team will purchase it using Dr. Ebong's grant and up to $500 from ECE department.

Is this source of funds already secured?   Yes __X___   No _____

Faculty Mentor

Please Assign: Dr. Aba Ebong as the mentor/supporter and Ms. Nan BouSaba as the team co-grader with the mentor.

Technical Contact(s)*

	Technical Contact 1	**Technical Contact 2**	**Technical Contact 3**
Name	Faculty Dr. Aba Ebong		
Phone Number	704-687-0307		
Email Address	mmencagl@uncc.edu		

Personnel

The table below provides an estimate of student's needs.

Discipline	Number	Discipline	Number
Mechanical	1	Electrical	2-4
Computer	1	Systems	
Other			

Company and Project Overview:

The project will be developed in the PV laboratory in the Electrical and Computer Engineering Department at the University of North Carolina at Charlotte under the supervision of Prof. Aba Ebong.

The Electroluminescence Imaging Technique (ELIT) System provides qualitative and quantitative characterization of the series resistance across silicon solar cells. The primary use for this system is to provide visual analysis of the series resistance for monocrystalline silicon solar cells - not intended for amorphous silicon or polycrystalline. The ELIT system is seen in Fig. 1.

Figure (1) UNCC PVRL ELIT (in the PV Lab)

The team will use the above tester in the research and development process.

Project Requirements:
Quantifying the resistance of a solar cell after high temperature sintering is always needed to shed Light into the optimum peak temperature and the optimum performance of the cell. It is therefore necessary to quickly assess the contact resistance within few seconds. Thus, the QEL can be very helpful in the production environment.
This project will require shaping a Cu-chuck that the solar cells would be placed for the measurement, camera with infrared capability to take the picture of the solar cell after being operated as an LED, programming in LabView or Mattlab or C++ to convert the image into the resistance – quantitative value.

Expected Deliverables/Results:
Deliverables include:
- A fully functional and automated QEL for measuring series resistance of a solar cell.
- Research Documentation
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Disposition of Deliverables at the End of the Project:

List here any specific skills, requirements, specific courses, knowledge needed or suggested:
- Interest in conducting research the PV solar cell laboratory.
- Familiarity or interest in metrology technology
- Interest in learning how a solar cell works as it relates to electrical/mechanical/computer engineering.

- Suggested Pre/Co-Requisites.: ECGR 3131 strong knowledge in Electronics.
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