SARVAJANIK UNIVERSITY

Research & Development Cell

A Report on the Inaugural Session-
My Research PPF- Past, Present & Future

Session Date: 18/04/2026
Place: N. J. Seminar Hall, SCET, Surat
Time: 11:00 AM to 12:45 PM

Objective of the Activity:
This initiative aims to provide a platform for researchers (from SU) to share their academic journey in three phases:

- **Past:** Research work carried out during their doctoral program, including key contributions and achievements.
- **Present:** Ongoing or completed research work, including details such as Ph.D. scholars guided, their research topics, and outcomes.
- **Future:** Planned research directions, potential collaborations, and proposals for future projects.

These sessions of the activity are conducted on every non-working Saturday. Each session is of one-hour duration, featuring 2–3 researchers presenting their Research PPF.

SARVAJANIK UNIVERSITY

Research & Development Cell

About the Inaugural session:

- The inaugural session of the seminar was conducted by **Prof. Dr. Kiran Pandya**, the esteemed Provost of SU, who shared his valuable insights on his research journey in **Econometrics**. Prof. Kiran Pandya not only discussed the technicalities of his field but also delved into the challenges he faced throughout his doctoral research. The session provided an engaging and comprehensive understanding of the practical applications of statistical techniques and the evolution of research in this domain.

Key Highlights of the Session:

1. **Research Journey and Struggles**:

Prof. Dr. Kiran Pandya began his talk by sharing his personal experiences in the field of **Econometrics**, touching upon the early struggles that shaped his career. He highlighted the obstacles he encountered while conducting research and how these difficulties eventually became stepping stones toward his professional growth. His narrative underscored the importance of perseverance and adaptability in academic research.

2. **Importance of Statistical Techniques**:

A significant portion of the session was dedicated to discussing the importance of **statistical techniques** in modern research. Prof. Kiran Pandya emphasized the role of tools like **SPSS** and **R-programming** in analyzing data, drawing attention to how these software packages have transformed the way researchers approach complex problems. By using these tools, econometricians are now able to analyze vast amounts of data more effectively, leading to more accurate insights and predictions.

3. **The Crisis in the Skies**:

One of the central themes of the session was the discussion of **"A Crisis in the Skies."** Prof. Kiran Pandya explained the paradox of how design solutions based on average data often fail to address the needs of diverse populations. He introduced the lesson: *"If you design for the average, you design for no one."* This statement highlighted the flaw in creating one-size-fits-all solutions and emphasized the necessity of considering the variability and diversity of real-world scenarios when designing policies, services, or systems.

4. **Simpson's Paradox**:

Another fascinating concept covered in the session was **Simpson's Paradox**, which is a statistical phenomenon where a trend appears in several different groups of data but disappears or reverses when the data are combined. Prof. Kiran Pandya illustrated this with an example from **India's interaction with police and courts**, demonstrating how misleading interpretations of aggregated data can occur. He cautioned that the nature of an association between variables can change when data from multiple groups are combined, underscoring the importance of **careful data disaggregation** to prevent erroneous conclusions.

5. **Key Lesson**:

Prof. Kiran Pandya concluded his session by imparting an essential lesson from his own research: the importance of context in statistical analysis. Data can often be misleading if not properly contextualized, and conclusions drawn from aggregated data may be inaccurate. Therefore, researchers must be vigilant and always consider the possibility that the data's inherent complexities may change or be misrepresented when viewed through a broad lens.

Conclusion:

Prof. Dr. Kiran Pandya's session provided a rich and nuanced perspective on the field of **Econometrics** and its application in real-world problem-solving. His discussion of statistical techniques, combined with his insightful reflections on the challenges of research, served as an eye-opener to the complexities of data analysis. The lessons from his talk—particularly the importance of designing for diversity and being cautious of misleading data aggregations—are invaluable for anyone involved in research, data analysis, or policy-making.

The session not only highlighted the technical aspects of Econometrics but also conveyed the broader lessons of adaptability, precision, and contextual understanding that are vital in today's data-driven world.

- The second session of the seminar was led by **Prof. Dr. Hiren Patel**, the Dean of the Faculty of Engineering & Technology, who shared insights into his journey at **SCET** and his extensive work in the field of **Photovoltaic (PV) Arrays**. He discussed his personal research journey, as well as the collective research progress of his scholars, particularly in the field of **photovoltaic energy systems** and **maximum power point tracking** (MPPT) in partially shaded conditions.

His research emphasizes the significant challenges that arise in solar energy systems, specifically **large-scale photovoltaic installations**. In particular, he highlighted issues related to the **shading effects** on solar panels, which can drastically reduce their performance. The presentation focused on two key research areas, both dealing with different aspects of **modeling and optimization of PV arrays** under **nonuniform solar insolation**.

Research Overview and Key Concepts:

1. Impact of Partial Shading on Photovoltaic Arrays:

The first part of Prof. Hiren Patel's research discusses the **impact of partial shading** on the **performance of photovoltaic (PV) arrays**. PV systems, particularly large ones used in **distributed power generation**, can suffer from reduced efficiency when parts of the array are shaded. This shading could result from various sources such as **cloud cover**, **nearby buildings**, **trees**, or other obstructions like **utility poles**. Under such conditions, the **Current-Voltage (I-V)** and **Power-Voltage (P-V)** characteristics of the array become complex, often showing **multiple peaks** in the power output.

This phenomenon makes it **difficult** to determine the **maximum power point (MPP)** because the array's performance is influenced by multiple local peaks, rather than a single global peak. The goal of his work was to **model and simulate these characteristics**, using **MATLAB** to study the behavior of the **PV arrays under partial shading conditions**. He introduced a **simulation tool** that is capable of:

- Modeling I-V and P-V characteristics under nonuniform insolation.
- Evaluating **maximum power point tracking (MPPT)** techniques, particularly in conditions of partial shading.

- Studying the effect of shading patterns and **array configurations** (how many modules in series and parallel).

Findings:

- **Shading significantly alters the performance** of PV arrays, especially in large installations where shading can be inconsistent.
- The configuration of the array (i.e., the number of PV modules connected in series or parallel) greatly influences the **available maximum power** under these conditions.
- The developed tool allows for the **study of shading effects** on PV panels, and has been validated experimentally.
- The **MATLAB code** for the developed model is publicly available, contributing to further research and development in this field.

2. Tracking the Maximum Power Point (MPP) under Partial Shading:

The second part of His research addresses the problem of tracking the **maximum power point (MPP)** in **partially shaded conditions**. As mentioned, the **I-V** and **P-V characteristics** of the PV arrays under partial shading show **multiple peaks**, making it hard to determine the **global peak (GP)** accurately. Most conventional Maximum Power Point Tracking (MPPT) algorithms fail to extract the maximum possible power under these conditions.

Key Contributions:

To overcome this limitation, Prof. Hiren Patel proposed a **novel algorithm** for **global peak (GP) tracking** that considers the complex behavior of PV arrays under partial shading. The **algorithm** is based on critical observations about how the **global peak** and **local peaks** behave under varying shading conditions. This algorithm works in conjunction with a **DC-DC converter** to ensure that the PV array always operates at the **global maximum power point**.

To improve the speed of the MPPT process, Prof. Patel also developed a **feed forward control scheme** for the **DC-DC converter**, which uses **reference voltage information** from the algorithm to speed up the tracking process. This method accelerates the tracking speed to **one-tenth of conventional methods**, drastically reducing the tracking time.

Findings:

- The proposed algorithm can track the **global power peak (GP)** more effectively than existing methods.
- The **feed forward control scheme** improves the tracking speed, making the system much more efficient.
- **Simulation and experimental results** validate the effectiveness of the algorithm and the controller in real-world conditions.

Conclusion:

Prof. Dr. Hiren Patel's research makes significant contributions to the field of **photovoltaic**

energy systems, particularly in **maximizing the power extraction** from PV arrays under **nonuniform shading conditions**. The research is especially relevant for large-scale PV installations where shading is often unavoidable.

His work provides both theoretical insights and practical solutions that can be implemented in **distributed solar power systems** to increase their efficiency and maximize their potential, even in less-than-ideal conditions.

Future Directions:

1. **Optimization of MPPT Algorithms**: Further refinement of the proposed MPPT algorithm could lead to even faster tracking speeds and more accurate power extraction in complex shading scenarios.
2. **Scaling the Model**: The simulation tools could be adapted to larger-scale, commercial solar installations, where shading is more prevalent.
3. **Experimental Validation in Diverse Environments**: Extensive testing in **real-world conditions** with varying degrees of shading could help validate and fine-tune the developed techniques for broader application.

He motivated the young faculty members to apply for research grants by sharing his own achievements:

1. He was awarded a Research Grant of Rs. 4,10,000/- from GUJCOST under the Minor Research Project category for his project titled *"Development of an Efficient Power Electronic Converter to Act as a Fuel Cell Emulator"*. The duration of this project was from July 2016 to 2018.
2. He also received a Research Grant of Rs. 25,000/- from GUJCOST under the SCITECH scheme for his project titled *"Microcontroller-Based Maximum Power Point Tracking for Photovoltaic Systems"*. This grant was sanctioned via the letter GUJCOST/SSP/06-07/1396 dated 19/03/07.

SARVAJANIK UNIVERSITY

Research & Development Cell

Attendance Sheet

My Reaserch PPF (Past , Present,Future)

Date:18/04/2026

Venue : N.J.Seminar Hall

Speaker: Hon.Provost Prof.Dr. Kiran Pandya sir,
Prof.Dr.Hiren Patel Sir (Dean faculty of Eng.& tech.)

Sr.No.	Name	Institute	Signature
1	Dr. Jigisha Pandya	SCET	
2	Dr. Bhadresh Dalal	SCOL	
3	Dr. Bantishah	SCCCA	
4	Dr Jimmy H. Kapadia	SRLIM	
5	Dr. Hiren Patel	SRLIM	
6	Dr. Niket Shastri	SCET	
7	Dr. Krupal R Trivedi	SCCCA	
8	Dr. Hemlata Agarwal	SRLIM	
9	Dr. Ranjan Sabhaya	SRLIM	
10	Ms. Yesha Joshi	SRLIM	
11	Mr. Bhuvneshwar Smit	SCET	
12	Dr. Mayank Patel	SCET	
13	Dr Nilesh V Shah	SCET	
14	Dr. Jaimin Shah	ECET	
15	Dr. Pratiksinh Vaghela	SRLIM	
16	Dr. Harshesh Patel	SRLIM	
17	Mitul Patel	SCET	
18	Dr. Vivek Champaneria	SCET	
19	Dr. Ashish Chaudhari	SCET	
20	Jignesh Joshi	SCET	
21	Dhaval Bhatt	SCET	
22	Keyur Rana	SCET	
23	Ruchir Dave	SCET	

SARVAJANIK UNIVERSITY

Research & Development Cell

Attendance Sheet

My Reaserch PPF (Past , Present,Future)

Date:18/04/2026

Venue : N.J.Seminar Hall

Speaker: Hon.Provost Prof.Dr. Kiran Pandya sir,
Prof.Dr.Hiren Patel Sir (Dean faculty of Eng.& tech.)

Sr.No.	Name	Institute	Signature
1	Dr. Jigar Sevalia	CED, SCET, Surat	
2	Dr. Piyush T. Patel	MED, SCET, Surat	18/4/26
3	Manasvi Tailor	Student, SRLIM	Manasvi
4	Tejal Joshi	SCET, IC Dept	
5	Ankita Patel	SCET	
6	Jayesh N. Desai	BRCM	18/4
7	Krishna Gandhi	SRLIM	
8	Jayshree Siddhpura	SRLIM	
9	Delnaz Variava	SRLIM	
10	Parinaz Bharucha	SRLIM	
11	Dr. Dhatri Pandya	SCET, Comp Engg	
12	Dr. Niraali Nanda	CO, SCET	
13	Dr. Hema Desai	ASHD, SCET	
14	Dr. Manisha Patel	" "	
15	Dr. Vaishali Desai	CH, SCET	
16	Dr. Vibha Desai	AI&DS, SCET	
17	Palak Desai	AI&DS, SCET	
18	Dr. Krishna Dalwadi	AI&DS, SCET	
19	Dr. Mitali Desai	IT SCET	
20	Dr. Kaushika Pal	MCA, SCET	
21	Dr. GAYATRI S. KAPADIA	SCET	
22	Dr. Ichhabhai Gandhi	CED, SCET	
24	Dr. Mehali Mehta	CED, SCET	

SARVAJANIK UNIVERSITY

Research & Development Cell

Attendance Sheet

My Research PPF (Past,Present,Future)

Date : 18/04/2026

Venue : N.J.Seminar Hall,SCET

Speakers : Hon. Provost Prof. Dr.Kiran Pandya

Dean-Faculty of Engg. & Tech. Prof. Dr.Hiren Patel

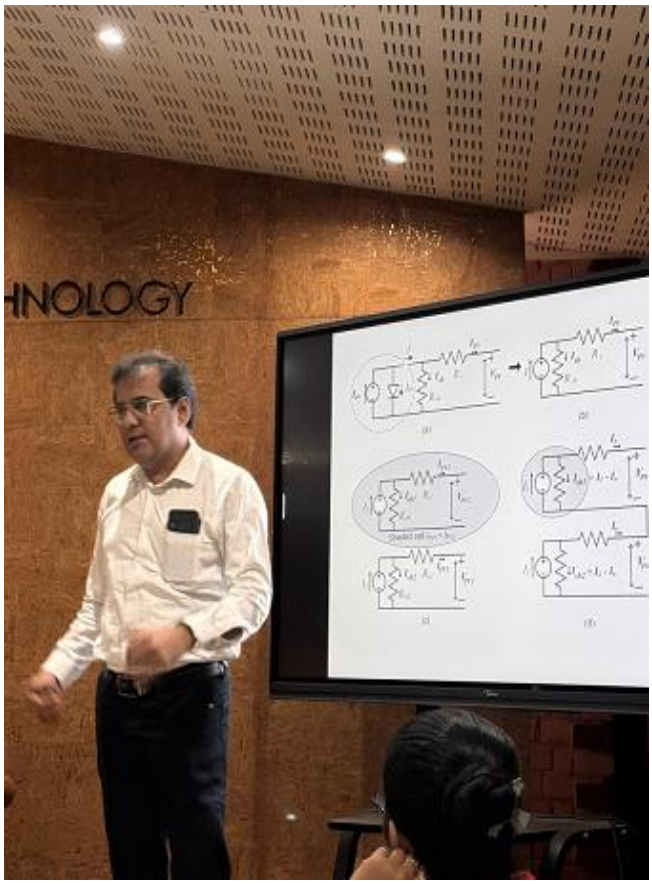
r.NO	Name	Institutes	Faculty/Students	Signature
1.	Dr. Pariza Kamboj	SCET	Faculty	
2	Prof. Bhumika Bhatt	SCET	Faculty	
3	Dr. Brijesh Nadiya	SCET	Faculty	
4	Prof. Chirag Purohit	SCET	"	
5	Utpal Pandya	SCET	"	
6	Bhavesh Patel	SCET	"	
7	Jaydeep Ghoghawala	SCET	"	

Signature:	Approved by Prof. Dr. Utpal T. Pandya
Name of Coordinators: Prof. Jigisha Pandya & Dr. Srujal Rana	Dean - Research and Development Cell

Photographs of the event:

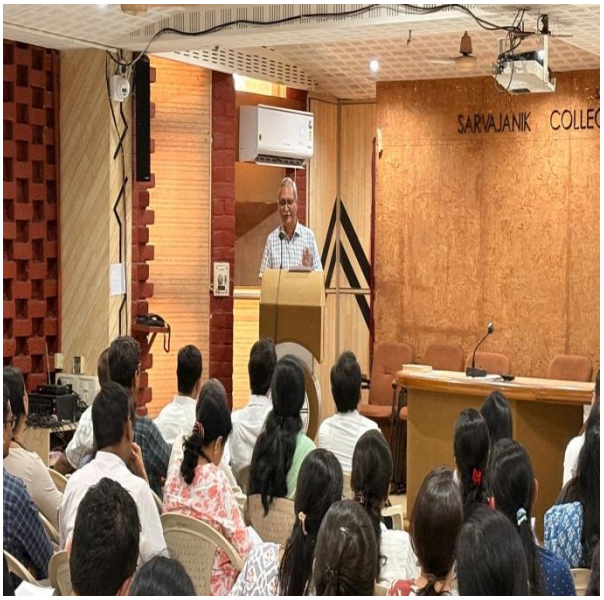
SARVAJANIK UNIVERSITY

Research & Development Cell



SARVAJANIK UNIVERSITY

Research & Development Cell



Report compiled by

Prof. Jigisha U. Pandya
Sarvajanik University, Surat