



## **Research Topics in Renewable Energy for 2022**



| Dr Arnold Rix     Tel:     021 808 3623       Fakulteit / Faculty:<br>Electrical Engineering     Department / Department:<br>Electrical & Electronic       Navorsingsarea / Area of Research:<br>Photovoltaic Systems – Renewable Energy     Photovoltaic Systems – Renewable Energy       Algemene beskrywing van navorsingsveld / General description of research area:<br>Solar PV systems, Hybrid power generation, data collection & analytics, forecasting     M.Eng.<br>(Structured)     Ph.D.       1. Optimal hybrid power generation system sizing (PV, wind, battery & hydro)<br>(Constrained design optimization to lower electricity costs)     X         2. Hybrid system performance analysis, forecasting and control of battery storage<br>(Intra-day Solar power forecasting with satellite derived data)     X     X        3. Design, build and test an automated testing platform for Bi-facial and floating<br>PV data acquisition devices that uses LORA as communication medium     X     X        4. Power to X - investigating the opportunity and impact of using excess<br>renewable energy power to generate hydrogen     X     X     X       5. Wireless PV structure monitoring     X     X     X     X     X       6 open topics to be defined in consultation with the student     X     X     X     X       Spesifieke voorvereistes / Specific requirements:<br>B.Eng. in Mechatronic or Electrical and Electronic Engineering.     Electrical and Electr   | Dr Arnold Rix   |          | Email: | rix@sun.ac.za |       |   |  |
|--|---|----------|--------|---------------|-------|---|--|
| Fakulteit / Faculty:<br>Electrical Engineering     Department / Department:<br>Electrical & Electronic       Navorsingsarea / Area of Research:<br>Photovoltaic Systems – Renewable Energy     Photovoltaic Systems – Renewable Energy       Algemene beskrywing van navorsingsveld / General description of research area:<br>Solar PV systems, Hybrid power generation, data collection & analytics, forecasting     M.Eng.<br>(Structured)     M.Eng.<br>(Research)       1. Optimal hybrid power generation system sizing (PV, wind, battery & hydro)<br>(Constrained design optimization to lower electricity costs)     X        2. Hybrid system performance analysis, forecasting and control of battery storage<br>(Intra-day Solar power forecasting with satellite derived data)     X        3. Design, build and test an automated testing platform for Bi-facial and floating<br>PV data acquisition devices that uses LORA as communication medium     X        4. Power to X - investigating the opportunity and impact of using excess<br>renewable energy power to generate hydrogen     X     X       5. Wireless PV structure monitoring     X     X     X       6 open topics to be defined in consultation with the student     X     X     X       Spesifieke voorvereistes / Specific requirements:<br>B.Eng. In Mechatronic or Electrical and Electronic Engineering.     Electrical and Electronic Engineering.  |   |          | Tel:   | 021 808 3623  |       |   |  |
| Electrical & Electrical & Electronic       Navorsingsarea / Area of Research:       Photovoltaic Systems – Renewable Energy       Algemene beskrywing van navorsingsveld / General description of research area:       Solar PV systems, Hybrid power generation, data collection & analytics, forecasting       Lys van onderwerpe/List of topics:     M.Eng.<br>(Structured)     M.Eng.<br>(Research)     Ph.D.       1. Optimal hybrid power generation system sizing (PV, wind, battery & hydro)<br>(Constrained design optimization to lower electricity costs)     X        2. Hybrid system performance analysis, forecasting and control of battery storage<br>(Intra-day Solar power forecasting with satellite derived data)     X        3. Design, build and test an automated testing platform for Bi-facial and floating<br>PV data acquisition devices that uses LORA as communication medium     X        4. Power to X - investigating the opportunity and impact of using excess<br>renewable energy power to generate hydrogen     X     X       5. Wireless PV structure monitoring     X     X     X       6 open topics to be defined in consultation with the student     X     X     X       Spesifieke voorvereistes / Specific requirements:<br>B.eng. In Mechatronic or Electrical and Electronic Engineering.     X     X     X  |   | <b>.</b> | 1      |               |       |   |  |
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| Interval in the state of the | Solar PV systems, Hybrid power generation, data collection & analytics, forecasting |          |        |               |       |   |  |
| Interval in the state of the | Lys van onderwerne /List of tonics:   |          | M Eng  | M Eng         | Ph D  |   |  |
| (Constrained design optimization to lower electricity costs)     X       2. Hybrid system performance analysis, forecasting and control of battery storage (Intra-day Solar power forecasting with satellite derived data)     X       3. Design, build and test an automated testing platform for Bi-facial and floating PV data acquisition devices that uses LORA as communication medium     X       4. Power to X - investigating the opportunity and impact of using excess renewable energy power to generate hydrogen     X       5. Wireless PV structure monitoring     X       6 open topics to be defined in consultation with the student     X       Spesifieke voorvereistes / Specific requirements:     B.Eng. in Mechatronic or Electrical and Electronic Engineering.   |   |          | -      | 5             | FILD. |   |  |
| (Intra-day Solar power forecasting with satellite derived data)     X       3. Design, build and test an automated testing platform for Bi-facial and floating PV data acquisition devices that uses LORA as communication medium     X       4. Power to X - investigating the opportunity and impact of using excess renewable energy power to generate hydrogen     X       5. Wireless PV structure monitoring     X       6 open topics to be defined in consultation with the student     X       X     X       X     X  |   |          |        |               | x     |   |  |
| PV data acquisition devices that uses LORA as communication medium     X       4. Power to X - investigating the opportunity and impact of using excess renewable energy power to generate hydrogen     X       5. Wireless PV structure monitoring     X       6 open topics to be defined in consultation with the student     X     X       Spesifieke voorvereistes / Specific requirements:     B.Eng. in Mechatronic or Electrical and Electronic Engineering.     V   |   |          |        |               | x     |   |  |
| renewable energy power to generate hydrogen     X       5. Wireless PV structure monitoring     X       6 open topics to be defined in consultation with the student     X     X       Spesifieke voorvereistes / Specific requirements:     B.Eng. in Mechatronic or Electrical and Electronic Engineering.     V   |   |          |        |               | x     |   |  |
| 6 open topics to be defined in consultation with the student     X     X     X       Spesifieke voorvereistes / Specific requirements:     B.Eng. in Mechatronic or Electrical and Electronic Engineering.     X     X   |   |          |        |               | x     |   |  |
| Spesifieke voorvereistes / Specific requirements:<br>B.Eng. in Mechatronic or Electrical and Electronic Engineering.   | 5. Wireless PV structure monitoring   |          |        | x             |       |   |  |
| B.Eng. in Mechatronic or Electrical and Electronic Engineering.  | 6 open topics to be defined in consultation with the student                        |          |        | x             | x     | x |  |
|  | Spesifieke voorvereistes / Specific requirements:                                   |          |        |               |       |   |  |
| Befondsing beskikbaar / Funding available:   | B.Eng. in Mechatronic or Electrical and Electronic Engineering.                     |          |        |               |       |   |  |
|  | Befondsing beskikbaar / Funding available:  |          |        |               |       |   |  |
| Yes, limited funding is available. R120 000 per year for topics 1 - 3.   |   |          |        |               |       |   |  |

Applications: Please email <u>rix@sun.ac.za</u> to discuss your topic of choice and receive the application form.