

## CURRICULAM VITAE

**Dr. G. Antilen Jacob**

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**Guest Faculty,**  
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Kanyakumari, 629166  
India.  
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### PERSONAL DETAILS

<b>Gender:</b>	Male	<b>Date of birth:</b>	09 <sup>th</sup> August 1994
<b>Country of birth:</b>	India	<b>Nationality:</b>	Indian
<b>Marital status:</b>	Single	<b>Personal E-mail:</b>	<a href="mailto:antilenjacob@gmail.com">antilenjacob@gmail.com</a>

### WORK EXPERIENCE

**2022 March – Till now** : **Guest Faculty in Central University of Tamil Nadu**

**2019 July- 2022 March** : Worked as **Project assistant** in National institute of technology, Tiruchirappalli for the project titled “ **Thermoablation mechanism in core-shell nanoparticles with high magnetic FeCo core**”

**2016 Aug -2022 March** : Worked as TEM operator (Technai G2 twin 300 kV)

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### EDUCATION

<b>PhD in Physics</b>	<ul style="list-style-type: none"><li>• Thesis Title: <i>Structural, magnetic and catalytic properties of iron and nickel based alloy synthesized through polyol process</i></li><li>• Employer: National Institute of technology, Tiruchirappalli, India.</li><li>• Research Group : Magnetic Materials Laboratory group. (<a href="https://www.nitt.edu/home/academics/departments/physics/Faculty/justin/Current%20Research/">https://www.nitt.edu/home/academics/departments/physics/Faculty/justin/Current%20Research/</a>)</li><li>• Research Supervisor: Dr. R. Justin Joseyphus</li><li>• Period: August, 2016 - September, 2021</li></ul>
<b>Masters in Physics</b>	<ul style="list-style-type: none"><li>• Securing 74% marks (<b>first class</b>)</li><li>• Thesis: <i>Growth and Characterization of Ba<sub>0.5</sub>Ca<sub>0.5</sub>FeO<sub>3</sub> single crystals</i></li><li>• National Institute of Technology, Trichy, India (<a href="http://www.nitt.edu">www.nitt.edu</a>)</li><li>• Supervisor: Dr. N.V. Giridharan,</li></ul>

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**Bachelors in  
Physics**

- Securing **79%** marks (**first class with distinction**)
- St Joseph's college (Autonomous), Trichy, India,
- Period: 2011 – 2014

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**FIELDS OF EXPERTISE**

- **Chemical synthesis of magnetic nanoparticles:** Expertized in polyol process for synthesizing composition and morphology controlled Fe and Ni based alloys.
- **Electron microscope :** 500+ hours working experience in analyzing various magnetic samples in TEM microscope
- **Equipment construction:** Proficiency in instrumentation and performing custom designed experiments
- **First order reversal studies:** Expert in FORC technique to identify various magnetic contribution (coercivity distribution, switching field, superparamagnetic and single domain fraction, dipolar and exchange effects) in the samples.
- **Low temperature magnetic measurements:** Expert in handling Low-temperature magnetic measurement systems (SQUID and VSM) and components including CCR, LN<sub>2</sub>, and cryostat and vacuum pumps.

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**Ph.D. RESEARCH**

We have investigated the structural and magnetic properties of Fe and Ni based alloys. The nanoparticles are prepared using a unique chemical process of polyol process. The nanoparticles are explored for structural and magnetic properties, magnetic particle hyperthermia, exchange bias, critical exponents, FORC and various magnetically separable catalytic applications.

**Instrumentation**

- Low temperature vibrating sample magnetometer for magnetization measurement
- Transmission electron microscopy (Technai G2 twin 300 kV), EDS, SAED and CBED.
- Atomic Force Microscope (AFM) and Magnetic force microscope (MFM) for surface and magnetic studies.
- X-Ray Diffractometer for crystal structure
- Scanning Electron Microscope (SEM).
- Skill of working in clean room (Class 1000)

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**TEACHING EXPERIENCE**

- Organized 2 month online Crash course on Introduction to amateur astronomy for school students (150 participants) during the lockdown time from 18<sup>th</sup> Jul to 6<sup>th</sup> Sep 2020.
- Worked as a part time faculty in TIME coaching academy with 4 years of teaching experience in

IIT-JEE exam training for 12<sup>th</sup> grade students.

- Worked as Guest teacher for Ramya Sathianathan Vidhyashram Senior Secondary School CBSE, Tanjore for NEET and JEE exam coaching.
- Created and Co-ordinated COSMOS students study group in NIT-Trichy for preparing competitive exams
- Co-ordinated Physics colloquium (weekly physics talk) in NIT-Trichy for 3 years from 2016-2018

**Softwares**      Origin, Lab view, GSAS (general structural analysis system).

**Language**      English, Malayalam, Tamil (Native), Hindi.

### **ACADEMIC ACHIEVEMENTS AND HONORS**

- Budding researcher award 2020 by NIT Trichy for best research
- Research excellence award during the academic year 2020 by Institute of Scholars
- Prof. K. Ananthapadmanaban medal for the academic excellence during the academic year 2014
- Thiru Ragasiv medal for the best performance in academic during the year 2013
- Prof. A. Selvaraj endowment cash award and Dr. APJ Abdul Kalam endowment cash award for securing top rank during the academic year 2013 and 2014
- Thiru P.E. Subramanian Iyear Medal II for the best academic performance during the academic year 2014.
- Gold medalist and university rank holder during undergrad.
- Qualified for State Eligibility Test (SET) conducted by the Government of India.

### **PUBLICATIONS**

- **Antilen Jacob, G.**, and Justin Joseyphus, R. (2021). Magnetic properties of FeCo iron oxide core-shell nanoparticles investigated through first order reversal studies. Appl. Phys. A, **127**(1), 33.
- **Antilen Jacob G.**, Sellaiyan, S., Uedono, A., and Joseyphus, R. J. (2020). Magnetic properties of metastable bcc phase in Fe<sub>64</sub>Ni<sub>36</sub> alloy synthesized through polyol process. Appl. Phys. A, **126**(2), 120.
- **Antilen Jacob, G.**, and Justin Joseyphus, R. (2021). Enhanced Curie temperature and critical exponents of Fe substituted NiCu alloy. Phys. Status Solidi a. **218**, 2100050.
- **Antilen Jacob, G.**, Sathiya Prabakaran, S.P., Swaminathan, G., and Justin Joseyphus, R. (2022). Thermal kinetic analysis of mustard biomass with equiatomic Iron-Nickel catalyst and its predictive modeling. Chemosphere, **286**, 131901
- Shebha Anandhi J, **Antilen Jacob G** and Justin Joseyphus R (2019) Heating characteristics of dextran modified magnetite nanoparticles by infrared thermography Mater. Res. Express, **6**,015045

- Shebha Anandhi J, **Antilen Jacob G** and Justin Joseyphus R (2020) Factors affecting the heating efficiency of Mn-doped Fe<sub>3</sub>O<sub>4</sub> nanoparticles J. Magn. Magn. Mater. **512**,166992
- Rajesh P, Greneche J-M, **Antilen Jacob G**, Arun T and Joseyphus R J (2019) Exchange Bias in Chemically Reduced FeCo Alloy Nanostructures Phys. status solidi, **216**, 1900051
- Ponraj R, Thirumurugan A, **Antilen Jacob G**, Sivaranjani K S and Joseyphus R J (2019) Morphology and magnetic properties of FeCo alloy synthesized through polyol process Appl. Nanosci. **10**,1808104.
- Sivaranjani K S, **Antilen Jacob G** and Justin Joseyphus R (2020) Coercivity and exchange bias in size reduced iron obtained through chemical reduction J. Magn. Magn. Mater. **513** 167228
- Francis F, Anandhi J S, **Antilen Jacob G**, Sastikumar D and Joseyphus R J (2020) Temperature Sensitivity of Magnetic Nanoparticle Hyperthermia Using IR Thermography
- Murugesan Karuppaiah, Xavier Benadict Joseph, Sea-Fue Wang, Balasubramanian Sriram, **Antilen Jacob G**, Ganesan Ravi (2021), Engineering Architecture of 3D-Urchin-like Structure and 2D-Nanosheets of Bi<sub>2</sub>S<sub>3</sub>@g-C<sub>3</sub>N<sub>4</sub> as the Electrode Material for a Solid-State Symmetric Supercapacitor, Energy & Fuels, **35**(15), 12569.

### ADMINISTRATION POSITIONS

- President of the International Society of optics and photonics (NITT-Students chapter) in the year 2018-2019
- Secretary of International Society of optics and photonics (NITT-Students chapter) in the year 2017-2018
- Deputy Warden of National Institute of Technology Diamond Hostel for 2 years from 2018-2020.
- Student president of Nakshatra (Astronomy club of NITT)

### PATENTS

- Indian patent published (Inventors: **G. Antilen Jacob and R Justin Joseyphus**) (2020). Thermomagnetic temperature indicator and method thereof. Indian patent. 202041005420A.

### OTHER INSTRUMENTATION EXPERIENCE

- Knowledge in Arduino and low power MSP430 microcontrollers and designed Arduino powered UV light chopping setup for sensing applications and speed controlled spin coater setup for thin film coating.
- Worked in designing horn antenna (Radio telescope) for receiving 21 cm line spectrum for Vision PRL project
- Worked in RF heating module and customary designed coil setup with water cooling and coupled with FLIR IR camera for studying the Neel and Brownian heating of nanoparticles for my SERB-CRG project
- Restored the LN<sub>2</sub> plant to working condition by revamped the helium compressor water chiller unit
- Restored the low temperature cryostat unit in Lakeshore VSM which is in failure mode for 8 years (Identified and rectified leaks in vacuum pumps, helium filling, etc..)
- Converted box furnace to tubular furnace for inert annealing of nanoparticles by drilling and inserting a quartz rod with gas inlet.
- Restored **TEM** unit several times after failure (well experienced in maintenance)

- Designed my own QFH (Quadrifilar helical antenna) and received NOAA satellite signals in 137.100 MHz with SDR Sharp.
  - Constructed a 40 m BITX HF ham radio and also with inverted V antenna communicated with 50 km surrounding (Licensed Ham radio operator: My call sign **VU3XAJ**)
  - Part of discussion and execution team for designing an in-house **oxygen plant** in NIT Trichy and also field worked for more than 20 hours in preparing zeolite bed and sacrificial bed.
  - Experience in handling 10” Newtonian reflector telescope, Auto tracking, software interfaced computerized movement with Satellitium software. (>200 hrs sky watching experience )
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### **SELECTED TRAINING PROGRAM ATTENDED**

1. One month hand on training on “Electron Microscopy- Why, How and what” conducted during June 15 – July 15, 2017 at Sophisticated Analytical Equipment Division, CSIR NPL New Delhi.
  2. Consortium Research Lecture Module in 1<sup>st</sup> order magnetic phase transition from Jan 9-13, 2017 in UGC DAE Consortium for Scientific Research, Indore.
  3. Summer School of Optics and Photonics from 25<sup>th</sup> to 28<sup>th</sup> July 2018 in Indian Institute of Science, Bangalore
  4. Technical seminar on X-Ray photoelectron spectroscopy for nanomaterials characterization at Karunya University on 19<sup>th</sup> Feb 2019.
  5. Participated in the Introductory training program on Atom Probe Tomography (NFAPT) conducted by IIT-M on 8-9<sup>th</sup> March 2019.
  6. National Workshop on Theory and Practices of Powder X-Ray diffraction analysis conducted by Pondicherry University on 4<sup>th</sup> April 2017.
  7. INUP-i2i Familiarization workshop on Nanofabrication Technologies by the center of nanoscience and engineering of Indian Institute of Science, Bangalore from 20-22 December 2021.
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### **PRESENTATION**

#### **Oral/Poster presentations**

- Poster presented in ROYAL SOCIETY OF CHEMISTRY (RSC-NIT) SYMPOSIUM on 5<sup>th</sup> Nov 2016 on the topic “Synthesis and magnetic properties of Fe nanoparticles by polyol process”
- Oral presentation in INTERNATIONAL WORKSHOP ON ADVANCED FUNCTIONAL NANOMATERIALS – 4<sup>th</sup> Edition (IWAN 4) on 22<sup>nd</sup> to 24<sup>th</sup> March 2017, in the topic “Core (Fe) - shell (Fe oxide) nanoparticles through polyol process”
- Poster presented in 29<sup>th</sup> annual general meeting of MRSI and national symposium on “Advances in Functional and Exotic materials” on 14<sup>th</sup> to 16<sup>th</sup> February 2018, in the topic “Phase transformation in chemically synthesized Ni nanoparticles”
- Poster presented in MSI magnetic society of India (ICMAGMA-18) on 10<sup>th</sup> to 14<sup>th</sup> December 2018, in the topic “composition controlled magnetic properties of FeNi nanoparticles”
- Poster presented in international conference on advanced material for sustainable energy and sensors (INCAMES-2019) on 16<sup>th</sup> to 17<sup>th</sup> Sep 2019, in the topic “Near room temperature magneto caloric effect and critical exponent of Cu<sub>1-x</sub>Ni<sub>x</sub> alloy.

- Poster presented in 31<sup>st</sup> AGM of MRSI & 2<sup>nd</sup> Indian Materials Conclave (MRSI) on 11<sup>th</sup> to 14<sup>th</sup> Feb 2020, in the topic “Magnetic particle hyperthermia using size reduced FeNi nanoparticles”
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#### **International visit**

- Participated in Leadership meeting for SPIE-NIT student chapter held at Strasbourg, France on 21<sup>st</sup> April 2018
- Participated in ICMAT-2019 conference held at Marina bay sands Singapore from 23<sup>rd</sup> to 28<sup>th</sup> June 2019.

#### **SELECTED INVITED PRESENTATION**

- **Guest Lecture:** “Advancements and Research Opportunities in Physics and Electronics” in Department of physics, KSR college of Arts and Science on 29<sup>th</sup> June 2020.
  - **Guest Lecture:** Delivered an invited talk on Analysis of VSM and TG/DTA for the hand on training program organized by Sri Ramakrishna mission college of Arts and Science in March, 2021.
  - Presented several Invited seminars for the Decoding Scientific Research (DSR) Instagram and YouTube pages
  - **Chief Guest:** Inaugurated a center for career development and delivered a talk in Ramya Sathianathan Vidhyashram Senior Secondary School CBSE, Tanjore on 5<sup>th</sup> of Jan 2022.
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#### **SELECTED WORKSHOP AND TRAINING PROGRAM ORGANIZED**

- Organized Junior Science Fair on behalf of SPIE and OSA Students chapter of National Institute of Technology for School students on Feb 28<sup>th</sup> 2018.
  - Organized Research and Career opportunities for women undergrads on 27<sup>th</sup> February 2019 for SFR College for women’s, sivakasi.
  - Organized visiting lecture program in Department of physics, NIT Trichy on the topic of Solar cells on 18<sup>th</sup> January 2019.
  - Organized guest lecture in Department of physics, NIT Trichy on the title of “High Throughput Materials Development for Electronics Devices” by Dr. Takahiro Nagata on 2<sup>nd</sup> December 2019.
  - Organized Students outreach educational program for GTR School on 14<sup>th</sup> November 2016
  - Organized one day workshop on Nano photonics and application and celebrating International day of light as a part of visiting lecturer program in Department of physics on 19<sup>th</sup> march 2018.
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**References:** Available upon request by Dr. R. Justin Joseyphus (Email: [rjustinj@nitt.edu](mailto:rjustinj@nitt.edu)) Associate professor, Magnetic materials laboratory, National institute of technology, Tiruchirappalli. Dr. N.V. Giridharan (Email: [giri@nitt.edu](mailto:giri@nitt.edu)), Associate professor, Advanced functional materials laboratory, NIT-Trichy. Dr.C. Venkateswaran ([cvenkateswaran@unom.ac.in](mailto:cvenkateswaran@unom.ac.in)), professor and head of Nuclear physics, University of Madras, Chennai.