

**Estimate the Location of Basaltic Intrusion in Karanglewas Village  
Jatilawang District Banyumas Regency Central Java Based on the  
Pseudogravity Anomaly Map**

Penulis Jurnal Ilmiah	: Seha, Urip Nurwijayanto Prabowo, Abdul Talib Bon
Jumlah Penulis	: 3 Orang
Status Penulis	: Penulis ke-1
Nama Jurnal	: 11th Annual International Conference on Industrial Engineering and Operations Management (IEOM) Singapore
No. ISSN/ISBN	: 2169-8767 / 978-1-7923-6124-1
Edisi	: March 7-11, 2021
Penerbit	: IEOM Society International
DOI Artikel	: -
URL	: <a href="http://ieomsociety.org/singapore2021/proceedings/6596/1494/1/012038">http://ieomsociety.org/singapore2021/proceedings/6596/1494/1/012038</a>
Terindeks	: Scopus
SJR	: -

# 11th Annual International Conference on Industrial Engineering and Operations Management Singapore, March 7-11, 2021

Due to many requests and the global pandemic, submission is extended to January 15, 2021  
Student Competition Submission Deadline: January 30, 2021

[CLICK HERE FOR SUBMISSION](#)

[Call for Papers – Flyer](#)

Due to the global pandemic, the event will be fully virtual via zoom.

Registration Fee: \$300 for Professional, \$150 for Students and \$100 for each additional paper.

Registration Link: <https://www.xcdsystem.com/IEOM/attendee/index.cfm?ID=ax32KF2>

[IEOM Paper Template \(\\*.docx\)](#) [PAPER TEMPLATE](#) [IEOM Abstract Template \(\\*.docx\)](#)

**Scopus®**

Scopus Indexing of  
IEOM Papers

[JOIN IEOM Member](#)

IEOM Society  
International is a  
501(c)(3) nonprofit  
organization  
approved by IRS  
(USA).

[IEOM Society  
International Site](#)

[IEOM Chapters  
around the World](#)

[IEOM Awards](#)

## Partner's Events

2018 INFORMS  
Annual Meeting,  
Phoenix, Nov. 4-7

African Engineering  
Education  
Association Events

WEEF 2017 Kuala  
Lumpur, Malaysia |  
IFEES, November 13-  
16, 2017

## Photos of Past Events

[IEOM 2017 Bogota  
Photos](#)



Home Authors Program Registration Committee Competitions Keynote Global Engineering Education Industry4.0 GBME Panels

Sponsors

# Proceedings

ISSN: 2169-8767 (U.S. Library of Congress)

ISBN: 978-1-7923-6124-1

## ID 001 Circular Economy: Exploratory Study of Steel Industry in Thailand

Vichathorn Piyathanavong, School of Manufacturing Systems and Mechanical Engineering (MSME), Sirindhorn International Institute of Technology (SIIT), Thammasat University, 99 Moo 18, Paholyothin, Khlong Luang, Pathum Thani 12120, Thailand

School of Knowledge Science, Japan Advanced Institute of Science and Technology, Japan, 1-1 Asahidai, Nomi, Ishikawa, 923-1292, Japan

Jose Arturo Garza-Reyes, Centre for Supply Chain Improvement, The University of Derby, Kedleston Road Campus, Derby, DE22 1GB, UK

Van-Nam Huynh, School of Knowledge Science, Japan Advanced Institute of Science and Technology, Japan, Asahidai, Nomi, Ishikawa, Japan

Sun Olapiriyakul, School of Manufacturing Systems and Mechanical Engineering (MSME), Sirindhorn International Institute of Technology (SIIT), Thammasat University, 99 Moo 18, Paholyothin, Khlong Luang, Pathum Thani 12120, Thailand

Jessada Karnjana, National Electronics and Computer Technology Center (NECTEC), National Science and Technology Development Agency (NSTDA), 111 Thailand Science Park (TSP), Phahonyothin, Khlong Luang, Pathum Thani 12120, Thailand

## ID 002 Lean Six Sigma and Agile integration Lean Six Sigma

Alessandro Laureani University of Strathclyde Leopardstown Dublin Ireland

## ID 003 Construction Material Ordering Policy Framework: Mamdani Approach

Siddharth Gupta, Gunjar Ahuja, and Girish Kumar, Department of Mechanical Engineering, Delhi Technological University, Delhi-110042, India

Rajesh Kumar Singh, Management Development Institute, Gurgaon-122007, India

## ID 004 Socio-Economic Factors Affecting Environmental Awareness and Knowledge of Consumers' Purchasing Behaviour of Green Products: A Study of Semarang Regency

Aries Susanty, Muhammad Mujiya Ulkhaq, Nia Budi Puspitasari, Heru Prastawa, Pradita Yusi Akshinta, and Pradhipta Listyawardhani, Industrial Engineering Department, Diponegoro University, Semarang, Indonesia

### **ID 005      Current Practices on Government Innovation towards Human Capital Development for achieving UAE Vision 2021**

Khatijah Omar, Md Khairul Azwan Md Razali, Hazman Samsudin, Muhammad Abi Sofian Abdul Halim and Norhayati Ab Manaf Institute of Tropical Biodiversity and Sustainable Development Universiti Malaysia Terengganu 21030, Kuala Nerus, Terengganu, Malaysia

Siti Nor Adawiyah Azzahra Kamaruddin and Jumadil Saputra Faculty of Business, Economic and Social Development Universiti Malaysia Terengganu 21030 Kuala Nerus, Terengganu, Malaysia

### **ID 006      The Assessment of Preparedness Level of Individual and Household in Disaster Prone Area in Sleman Regency to Encounter Merapi Mountains Eruptions**

Naniek Utami Handayani, Tatag Wahyu Sugmasantika, Yusuf Widharto, and Zainal Fanani Rosyada, Department of Industrial Engineering, Diponegoro University, Semarang, 50275, Indonesia

### **ID 007      Smart sustainable manufacturing: From Literature review to a green framework**

Imane Benkhati Search Results Web result with site links Faculté des Sciences Semlalia Marrakech Casablanca Grand Casablanca Morocco

### **ID 008      Smart sustainable manufacturing: From Literature review to a green framework**

Imane Benkhati, Faculté des Sciences Semlalia Marrakech Casablanca Grand Casablanca, Morocco

### **ID 009      The Performance of Project Management at Traditional Shipyard in East Java, Indonesia**

Yugowati Praharsi, Business Management, Shipbuilding Institute of Polytechnic Surabaya, Surabaya, Indonesia

Muhammad Abu Jami'in, Electrical Engineering Department, Shipbuilding Institute of Polytechnic Surabaya, Surabaya, Indonesia

Gaguk Suhardjito, Business Management, Shipbuilding Institute of Polytechnic Surabaya, Surabaya, Indonesia

Hui-Ming Wee, Industrial and System Engineering, Chung Yuan University, Chung Li, Taiwan

### **ID 010      A Multi-Objective Optimization Model for an Algal Biofuel Supply Chain Integrating Resource Recirculation**

Celine Marie A. Solis, Jayne Lois G. San Juan, and Dennis E. Cruz, Industrial Engineering Department, De La Salle University, 2401 Taft Avenue, Manila, Philippines

### **ID 011      Food Waste Management of Restaurants in KwaZulu-Natal South Africa**

Saijal Sucheran and Oludolapo A. Olanrewaju, Department of Industrial Engineering, Durban University of Technology, Durban, South Africa

### **ID 012      Optimal Restoration of Community Structures for Enhancing Interdependent Infrastructure Network Resilience**

Yasser Almoghathawi, Systems Engineering Department, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia

### **ID 013      Implementation of Quality Management System ISO 9001 in A Telecom Network Operation Centre – A Case Study**

Diana Ortiz-Rangel, and Luis Rocha-Lona, ESCA Santo Tomas, Instituto Politecnico Nacional, Mexico City, Mexico

Lila Margarita Bada-Carbajal, Instituto Tecnológico Superior de Alamo Temapache, Veracruz, Mexico

Jose Arturo Garza-Reyes, and Simon Peter Nadeem, Centre for Supply Chain Improvement, University of Derby, Derby, UK



**ID 015 Culture & Personality: Directional influence on Consumer Switching**

Anjali Sharma, R.R.K. Sharma, Dept. of Industrial & Management Eng., Indian Institute of Technology-Kanpur, India

Kuei-Kuei Lai, Department of Business Administration, Chaoyang University of Technology, Taiwan

**ID 026 Optimizing bus frequency in Kuwait to minimize total cost and satisfy the average daily demand**

Sharaf Alkheder, Fahad AlRukaibi and Areej Zaqqouq, Civil Engineering Department, College of Engineering & Petroleum, Kuwait University, Kuwait

**ID 027 Conceptual Framework of Performance Improvement in Coffee Production Using Integrated Lean Technique**

Yotsaphat Kittichotsatsawat, Ph.D.'s Program in Industrial Engineering, Department of Industrial Engineering, Faculty of Engineering, Chiang Mai University, Chiang Mai 50200, Thailand

Korrakot Yaibuathet Tippayawong, Department of Industrial Engineering & Excellence Center in Logistics and Supply Chain Management, Chiang Mai University, Chiang Mai 50200, Thailand

**ID 028 Assessment of the Health Problems and Health Hazards Prevalent among the Garment Workers of Bangladesh – An Approach with Risk Priority Number and Best-Worst Method**

Ahmed Shoyeb Raihan, Department of Industrial & Production Engineering, Bangladesh University of Engineering & Technology, Dhaka, Bangladesh

Farzana Islam, Department of Industrial & Production Engineering, Bangladesh University of Engineering & Technology, Dhaka, Bangladesh

**ID 029 Throughput Rate Calculation for Mobile Racks AS/RS using Timed Petri Nets**

Yassine BOUDGHENE STAMBOULI, Faculty of Technology – MELT Laboratory, University Abou-Bakr. BELKAID of Tlemcen, Algeria

Samir HAMACI, Quartz Laboratory (EA 7393), ECAM-EPMI, 13, Bvd de l'Hautil, 95092, Cergy-Pontoise, France

**ID 030 Traceability Architecture Technology for Short Commercial Exchange**

John Jairo Aguilera Camacho, Jeniffer Paola Torres Salazar, Angela Maritza Mora Gómez and Lina Nataly Alvarado Riaño, Research Group EGE, Early Career Researcher Grizzly, Fundación Universitaria Panamericana – UNIPANAMERICANA, Bogotá D.C., Colombia

**ID 031 Life Cycle Assessment of Ordinary Portland Cement (OPC) using Damage Oriented (Endpoint) Approach.**

Busola Dorcas Olagunju, and Oludolapo Akanni Olanrewaju, Department of Industrial Engineering, Faculty of Engineering and the Built Environment, Durban university of Technology, Durban, South Africa

**ID 032 Marine Predators Algorithm and Tunicate Swarm Algorithm for Power System Economic Load Dispatch**

Oluwafemi Ajayi, Reolyn Heymann and Ewaoche John Okampo, Centre for Collaborative Digital Networks

Department of Electrical and Electronic Engineering Science, University of Johannesburg, South Africa

**ID 033 Analysis and operational planning for a kitchen equipment company facing new market needs as a consequence of the COVID-19 pandemic**

Carlos M. Linares, and Jorge A. Peinado, Department of Engineering Management, Universidad de Monterrey, San Pedro Garza Garcia, N.L. México

Zaliha Zainuddin, Zaleha Mohamad and Jumadil Saputra, Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia

Mohd Hanafi Azman Ong, Department of Statistics and Decision Sciences, Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Johor, Muar, 85000 Segamat, Johor, Malaysia

Abdul Talib Bon, Department of Production and Operations, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, Malaysia

#### **ID 588      Designing of Automated Controlled Irrigation System for Domestic Application**

PB Sob, Department of Mechanical Engineering, Faculty of Engineering and Technology, Vaal University of Technology, Vanderbijlpark 1900, Private Bag X021, South Africa

#### **ID 589      The Power of Hypothesis Parameters Testing on Geometric Distributions and Its Simulation**

Budi Pratikno, and Evita Luaria Wulandari, Department of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Jenderal Soedirman, Purwokerto, Indonesia

Abdul Talib Bon, Department of Production and Operations, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, Malaysia

#### **ID 590      Effect of Risk Control as Moderator of Relationship Between Government Support, Training, Digital Marketing, Financial Capital and Performance of SMEs in Indonesia**

Dede Ansyari Guci, Faculty of Economy, Universitas Prima Indonesia, Medan, North Sumatera Province, Indonesia

Dede Ansyari Guci, Puspa Liza Ghazali, Salman Lambak and Juliana Arifin, Faculty of Business and Management, Universiti Sultan Zainal Abidin. 21300 Kuala Nerus, Terengganu, Malaysia.

Abdul Talib Bon, Department of Production and Operations, University Tun Hussein Onn Malaysia, Malaysia

#### **ID 591      Estimate the Location of Basaltic Intrusion in Karanglewas Village Jatilawang District Banyumas Regency Central Java Based on the Pseudogravity Anomaly Map**

Sehah and Urip Nurwijayanto Prabowo, Department of Physics, Faculty of Mathematic and Natural Sciences, Jenderal Soedirman University, Purwokerto, Central Java, Indonesia

Abdul Talib Bon, Department of Production and Operations, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, Malaysia

#### **ID 592      Application of Economic Mathematical Model in Production of Gold Sub-Sector in Indonesia**

Sukono, Riaman, and Collins Friskilia Sibarani, Department of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Padjadjaran, Indonesia

Hasriati, Departemen of Mathematics, Faculty of Mathematics and Natural Sciences, Riau University, Indonesia

Agung Prabowo, Departemen of Mathematics, Faculty of Mathematics and Natural Sciences, Jenderal Soedirman University, Indonesia

Kalfin, Doctor Program of Mathematics, Faculty of Mathematics and Natural Sciences, Universitas Padjadjaran, Indonesia

Faiza Renaldi, Department of Informatics Engineering, Faculty of Science and Informatics, Universitas Jenderal Achmad Yani, Cimahi, West Java, Indonesia

Abdul Talib Bon, Department of Production and Operations, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, Malaysia

#### **ID 593      Analysis of Relationship between Leadership and Employee Performance at Manufactur Company in Indonesia**

### **ID 1295 The Influence of Medical Services and Work Environment in the Context of Work Productivity through Job Satisfaction of Health Workers at Pekkabata Health Centre (Puskesmas)**

Fadilah, Student of Management Magister Program, Sekolah Tinggi Ilmu Ekonomi Amkop Makassar

Rasjidin Abdullah, Umar Syarifuddin, Postgraduate Program, Sekolah Tinggi Ilmu Ekonomi Amkop Makassar

Andi Bintang, Department of Health, Akademi Keperawatan Lapatau, Bone, Indonesia

Saidna Zulfiqar Bin-Tahir, Rusdianto, Abdullah Badmas, Universitas Iqra Buru, Maluku, Indonesia

### **ID 1296 Analysis of the Quality of Trainers/Teachers, School Culture through the Quality of Learning against Student Achievements in Special School Talents in Sports**

Rusna Supardi, Student of Management Magister Program, Sekolah Tinggi Ilmu Ekonomi Amkop Makassar

Mislia, Gunawan Bata Ilyas, Postgraduate Program, Sekolah Tinggi Ilmu Ekonomi Amkop Makassar

Chuduriah Sahabuddin, Sociology Department, Universitas Al Asyariah Mandar

Armin Anwar, Student of Doctoral Program, Universitas Muslim Indonesia, Makassar

Heni Waluyo Siswanto, Nina Purnamasari, Pusat kurikulum dan perbukuan, Kementerian Pendidikan dan Kebudayaan

### **ID 1297 Contemporary Sharia Business Law Formulation (Implementation of Fiqhiyah Rules in E-Commerce Law)**

Fauzi Muhammad, Ph.D Candidate of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

Muannif Ridwan, Lecturer at Islamic University of Indragiri and Ph.D student of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

Nilfatri, Ph.D Candidate of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

Mubarik, Ph.D Candidate of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

Syaiful Anwar, Ph.D Candidate of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

H. M. Hasbi Umar, Professor of Islamic Law at Ph.D Program of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

Abdul Ghafar, Senior Lecturer of Islamic Law at Ph.D Program of Sultan Thaha Saifuddin State Islamic University Jambi-Indonesia

### **ID 1298 Digital Transformation of Supply Chains during Crisis: Covid19**

Atour Taghipour and Mohammed Merimi Faculty of International Business Normandy University Le Havre, FRANCE

### **ID 1300 Be an Edutainer to Mesmerise the Learners**

Deepak L. Waikar, Managing Partner, EduEnergy, Singapore and Chair, The IEEE Education Society Chapter, Singapore

### **ID 1301 Association Rule Mining for Driving Behaviors and Road Traffic Accidents in Kuwait**

Atheer AlMutairi, Dana AlKandari, Loulwah Shummais, Reem AlAjmi, Takeaki Toma, Department of Industrial Engineering, American University of the Middle East, P.O.Box: 220 Dasman, 15453 Kuwait

### **ID 1303 On the dependency of material flows on quality and the configuration of the inspection system**

Moshe Eben-Chaime Department of Industrial Engineering & Management Ben Gurion University of the Negev Be'er Sheva, Israel

### **ID 1305 Quality Assurance in Engineering Education: Accreditation and Its Global Influence**

Mohammad Yeakub Ali<sup>1</sup>, Seri Rahayu Ya'akub<sup>2</sup> and Ramesh Singh<sup>3</sup>, Mechanical Engineering Programme Area, Faculty of Engineering, Universiti Teknologi Brunei, Tungku Highway, Gadong BE1410, Brunei Darussalam

Muataz Hazza F. Al Hazza, Mechanical and Industrial Engineering Department, School of Engineering, American

University of Ras Al Khaimah, PO Box 10021, United Arab Emirates

Erry Y. T. Adesta, Department of Manufacturing and Materials Engineering, Faculty of Engineering, International Islamic University Malaysia, P.O. Box 10, 50728 Kuala Lumpur, Malaysia

**ID 1307      Design for Safety and Human Factors in Industrial Engineering: A Review towards a Unified Framework**

Mario Fagnoli, DICMA, Faculty of Civil and Industrial Engineering, Sapienza University of Rome, Rome, Italy and Department of Rural Development, Ministry of Agriculture, Food and Forestry Policies, Rome, Italy

**ID 1308      Supply Chain Risk Analysis Using House of Risk Model on Digitizing of Warung Tegal**

Gladysa Valerie and Rienna Oktarina Industrial Engineering Department Bina Nusantara University Jakarta, Indonesia

## Committee

### Conference Committee

#### Conference Chairs

- **Assoc. Prof. Tan Yan Weng**, Head of Programme, Logistics & Supply Chain Management, School of Business, Singapore University of Social Sciences, Singapore
- **Dr. Ahad Ali**, Associate Professor and Director of Industrial Engineering Program, Lawrence Technological University, Michigan, USA

#### Honorary Chair

- **Dr. Robert de Souza**, Executive Director, The Logistics Institute – Asia Pacific and Senior Fellow, Department of Industrial Systems Engineering and Management, National University of Singapore

#### Program Chairs

- **Dr. Aldy Gunawan**, Assistant Professor of Information Systems (Practice), School of Computing and Information Systems, Singapore Management University, Singapore
- **Dr. Tan Kok Choon**, Associate Professor (Practice) & Deputy Head of Department, Department of Analytics & Operations, NUS Business School, National University of Singapore

#### Technical Chairs

- **Dr. M. Affan Badar**, Professor and Former Chair, Applied Engineering & Technology Management Dept., Indiana State University, Terre Haute, IN, USA
- **Dr. Sugoutam Ghosh**, School of Business, Singapore University of Social Sciences, Singapore
- **Dr. Tay Huay Ling**, School of Business, Singapore University of Social Sciences, Singapore

#### IEOM Global Engineering Education Chairs

- **Dr. Abu Masud**, Boeing Global Engineering Professor, Industrial and Manufacturing Engineering Department, Wichita State University, Kansas, USA
- **Dr. Hamid Parsaei**, Professor of Industrial and Systems Engineering, Texas A&M University (College Station), USA

#### IEOM Global Business Management Education Chairs

- **Prof. Jose Arturo Garza-Reyes**, Professor of Operations Management and Head of the Centre for Supply Chain Improvement, College of Business, Law and Social Sciences, The University of Derby, UK
- **Prof. Vikas Kumar**, Director of Research and Scholarship and Professor of Operations and Supply Chain Management, Bristol Business School, University of the West of England, UK

#### Industry Solutions Chairs

- **Dr. Abdul Talib Bon**, UTHM, Malaysia

#### Industry 4.0 Chair

- **Dr. Mehran Doulat**, Xiamen University, Malaysia

#### Publication Chair

- **Dr. Mohammed Rahman**, Central Connecticut State University, USA

#### Women in Industry and Academia Chair

- **Dr. Tay Huay Ling**, School of Business, Singapore University of Social Sciences, Singapore

#### Sponsors and Exhibitors Chair

- **Professor Don Reimer**, Lawrence Technological University, Southfield, Michigan, USA

---

## Organizing Committee

- Goh Shao Hung, Associate, School of Business, Singapore University of Social Science, Singapore
- Dr. Murphy Choy, MC EduTech, Singapore
- David Chan, Advent2 Labs, Singapore
- Dr. Jafri Mohd Rohani, Universiti Teknologi Malaysia
- Dr. Seyed Mehdi Zahraei, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Maria Cecilia Rojas Lopez, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Dixon So Lok Kan, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Zhao Qitong, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Yap Wei Yim, Head of Minor, International Trade School of Business, Singapore University of Social Sciences, Singapore

---

## Track Chairs

#### Artificial Intelligence (AI)

- **Dr. Rawinun Praserttaweelap**, King Mongkut's Institute of Technology Ladkrabang, Bangkok, Thailand

#### Automation and Agility

- **Dr. Tawanda Mushiri**, University of Zimbabwe, Harare, Zimbabwe

#### Aviation and Aerospace

- **Dr. Hesham Ahmad Flaih Al Momani**, Assistant Professor, Department of Industrial Engineering, Hashemite University, Zarqa, Jordan

#### Business Analytics

- **Yi Wang**, School of Management, Hangzhou Dianzi University, Hangzhou, China
- **Dr. Tang Hua Jun**, Head of Department of Decision Sciences, Macau University of Science and Technology, Macau

#### Business Management

- **Dr. Shekar Babu**, AMRITA School of Business, Bangalore, India

#### Case Studies

- Dr. Javad Feizabadi, MIT Global SCALE Network in Asia- Malaysia Institute for Supply Chain Innovation, Malaysia

#### Computers and Computing

- Dr. June Tay, Head of Programme, Digital Media Programme, School of Science and Technology, Singapore University of Social Sciences, Singapore

#### Construction Management

- Assoc. Prof. Tan Teng Hooi, Head of Programme, Building and Project Management, School of Science and Technology, Singapore University of Social Sciences, Singapore

#### Cyber Security

- Dr. Shamsul Huda, Lecturer in Computer Science, Cyber Security Research and Innovation Centre (CSRI), School of Information Technology, Faculty of Science Engineering and Built Environment, Deakin University, Burwood, Victoria, Australia

#### Data Analytics and Big Data

- Assoc. Prof. James Tan, Head of Programme, Business Analytics, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Farzad Firouzi, Associate Professor, Industrial Engineering Dept., Faculty of Engineering, University of Sistan and Baluchesta, Iran

#### Decision Sciences

- Dr. Seyed Mehdi Zahraei, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Vassilis C Gerogiannis, University of Thessaly, Larissa, Greece

#### Defense and Aviation

- Mejar Wong Wai Loong, National Defence University of Malaysia
- Lt Kol Zamri bin Ismail, National Defence University of Malaysia

#### Design

- Prof. Ir. Dr. Mohd Khairol Anuar Mohd Ariffin, University Putra Malaysia, Selangor, Malaysia

#### Disruptive Technologies / Smart Technologies

- Alfonso, Adrian B., Mapua University, Makati City, Philippines

#### e-Business/e-Service/e-Commerce

- Dr. Marcus Lee, Head of Programme, Marketing, School of Business, Singapore University of Social Sciences, Singapore

#### Energy

- Dr. Md. Mizanur Rahman, University Technology Malaysia (UTM), Johor Bahru, Malaysia

#### Engineering Economy / Financial Engineering

- Dr. M. Affan Badar, Indiana State University, Terre Haute, IN, USA
- Prof. Jerekias Gandure, University of Botswana, Gaborone, Botswana

#### Engineering Education

- Dr. Tony Halim, Associate, School of Business, Singapore University of Social Science, Singapore

## Engineering Education – Industrial Engineering Curriculum Development

- Dr. Jafri Mohd Rohani, Universiti Teknologi Malaysia

## Engineering Management

- Dr. Abdul Talib Bon, UTHM, Malaysia

## Entrepreneurship and Innovation

- Dr. Indra Gunawan, The University of Adelaide, Australia

## Environmental Engineering Systems

- Mrs. Chea Eliyan, Project Coordinator and Deputy Head, Department of Environmental Science, Royal University of Phnom Penh, Cambodia

## ERP

- Dr. Jiun-Yan Shiau, Department of Logistics Management, National Kaohsiung First University, of Science and Technology, Kaohsiung, Taiwan

## Facilities Planning and Layout

- Dr. Zeki Ayağ, Kadir Has University, Turkey

## Healthcare Systems

- Dr. Farzad Firouzi, Associate Professor, Industrial Engineering Dept., Faculty of Engineering, University of Sistan and Baluchesta, Iran

## Human Factors and Ergonomics

- Yoshiki B. Kurata, Industrial Engineering Department, Technological Institute of the Philippines Quezon City, Philippines
- Dr. Rouf Iqbal, Associate Professor, Ergonomics and Human Factors, NITIE, Mumbai, India

## IE / OM in Asia

- Dr. Ho Hwi Chie, Binus University, Indonesia

## Industrial Management

- Dr. Pravin Tambe, Faculty in Operations Management and Decision Sciences at Indian Institute of Management Tiruchirappalli, India

## Industry Best Practices

- Edly Ramly, Lean Six Sigma Master Black Belt, EFR Certification, Malaysia
- Masaru Tezuka, Hitachi Solutions East Japan, Ltd., Japan

## Information Technology and Information Systems

- Dr. Hsieh Cheng-Hsien, School of Business, Singapore University of Social Sciences, Singapore
- Prof. Sukhjeet Singh, Guru Nanak Dev Engineering College, Ludhiana, Punjab, India

## Inventory Control and Management

- Dr. Sugoutam Ghosh, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Salvatore Miranda, University of Salerno, Italy



- Dr. Muhammad Saad Memon, Assistant Professor, Industrial Engineering and Management, Mehran University of Engineering and Technology, Pakistan

#### Lean

- Dr. Bernardo Villarreal, Universidad de Monterrey, Mexico
- Abdullah Y Dhafer, Aramco, Saudi Arabia

#### Logistics Management

- Dr. Wahyudi Sutopo, Universitas Sebelas Maret, Surakarta, Indonesia

#### Manufacturing

- Dr. Noha Mostafa, Industrial Engineering Department, Zagazig University, Egypt

#### Material Flow Cost Accounting (MFCA)

- Dr. Wichai Chattinnawat, Chiang Mai University, Thailand

#### Mathematical Sciences

- Dr. Md. Haider Ali Biswas, Khulna University, Bangladesh

#### Mechatronics and Predictive Machinery Degradation

- Dr. Jihong Yan, Professor in Industrial Engineering, Deputy Dean of School of Mechatronics Engineering and Head of Intelligent Manufacturing Scientific Research Team, Harbin Institute of Technology, Harbin, China

#### Modeling and Simulation

- Dr. Ali ElKamel, University of Waterloo, Canada
- Dr. Magdy Helal, American University of the Middle East (AUM), Kuwait

#### Occupational Safety and Health (OSH)

- Dr. Jafri Mohd Rohani, Universiti Teknologi Malaysia
- Dr. Qutubuddin S.M., P.D.A. College of Engineering, Gulbarga, Karnataka, India

#### Operations Management

- Dr. Zhao Qitong, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Fernando González Aleu, Dept. de Ingeniería, Universidad de Monterrey, Mexico

#### Operations Research

- Prof. Rene Estember, Mapua University, Philippines

#### Optimization

- Dr. Haider Ali Biswas, Khulna University, Bangladesh

#### Product Design and Development

- Dr. Leonardo Frizziero, Senior Assistant Professor, DIN – Department of Industrial Engineering, Alma Mater Studiorum University of Bologna, Bologna, Italy

#### Product Lifecycle Management (PLM)

- Dr. Ali Allahverdi, Kuwait University, Kuwait

#### Production Planning and Control

- Mr. Chee Wai Meng, School of Business, Singapore University of Social Sciences, Singapore

#### Project Management

- Dr. Yuan Xuchuan, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Shazia Nauman, Head of Department and Associate Professor, Riphah School of Business & Management, Riphah International University, Pakistan

#### Quality Control and Quality Management

- Assoc. Prof. Park Byung Joon, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Ferdous Sarwar, IPE, BUET, Dhaka, Bangladesh

#### Reliability and Maintenance

- Dr.-Ing. Zied Hajej, Université de Lorraine, France

#### Service Engineering and Service Management

- Dr. Kannapha Amaruchkul, National Institute of Development Administration, Thailand

#### Six Sigma

- Dr. Ashish Dwivedi, Assistant Professor, Jindal Global Business School, O.P. Jindal Global University, India

#### Smart Mobility and Smart Cities

- Dr. Maria Cecilia Rojas Lopez, School of Business, Singapore University of Social Sciences, Singapore

#### Statistical Process Control

- Engr. Maricar M. Navarro, Technological Institute of the Philippines Quezon City, Philippines

#### Supply Chain Management

- Dr. Shao Hung Goh, Part Time Professor, Singapore University of Social Sciences, Singapore

#### Sustainability in Supply Chain, Enterprise Operations and Strategies

- Prof. Jose Arturo Garza-Reyes, Derby Business School, University of Derby, UK
- Dr. Vikas Kumar, Bristol Business School, University of the West of England, UK

#### Sustainability and Green Systems

- Assoc. Prof. Park Byung Joon, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Asela K. Kulatunga, University of Peradeniya, Sri Lanka

#### Sustainable Manufacturing

- Dr. Khumbulani Mpofu, Gibela Research Chair in Manufacturing and Skills Development, Tshwane University of Technology, Pretoria, South Africa
- Dr. Sambil Charles Mukwakungu, University of Johannesburg, South Africa

#### Systems Dynamics

- Dr. Mahdi Bastan, University of Eyvanekey, Garmsar, Iran

#### Systems Engineering

- Dr. Olumuyiwa Asaolu, Department of Systems Engineering, University of Lagos, Nigeria

#### Technology Management

- Dr. Hsieh Cheng-Hsien, School of Business, Singapore University of Social Sciences, Singapore
- Dr. Norizah Mohamad, Universiti Sains Malaysia (USM), Pulau Pinang, Malaysia

#### Total Quality Management (TQM)

- Dr. Salah Haridy, University of Sharjah, Sharjah, UAE
- Dr. M. Shamsuzzaman, University of Sharjah, Sharjah, UAE

#### Transportation and Traffic

- Dr. Abbas Mahmoudabadi, Mehrastan University, Gilan, Iran

#### Waste Management

- Ms. Sebonkile Thaba, University of Johannesburg, South Africa

#### Work Design, Measurement, Standardization and ISO

- Dr. Peter Baonhe Sob, Vaal University of Technology, South Africa

---

### COMPETITION COMMITTEE

#### Undergraduate Student Paper Competition Chair

- Dr. Aldy Gunawan, Assistant Professor of Information Systems (Practice), School of Computing and Information Systems, Singapore Management University, Singapore

#### Graduate/Postgraduate Student Paper Competition Chair

- Dr. Md. Mizanur Rahman, University Technology Malaysia

#### Doctoral Dissertation Competition Chair

- Dr. Mehran Doulat, Xiamen University, Malaysia

#### Master Thesis Competition Chairs

- Dr. Hayder Zghair, Penn State Berks, Reading, Pennsylvania, USA

#### Senior Design Capstone Project / FYP Presentation Competition Chair

- Mr. Chee Wai Meng and Dr. Dixon So Lok Kan, Singapore University of Social Sciences, Singapore

#### Undergraduate Research Competition Chair

- Dr. Andy Pandein, SVSU, Michigan, USA

#### High School / Middle School STEM Competition Chairs

- Professor Don Reimer, LTU, MI, USA

## Supply Chain and Logistics Competition Chair

- Dr. Yap Wei Yim, Singapore University of Social Sciences, Singapore

## Lean Six Sigma Competition Chair

- Dr. Saso Krstovski, Lean Manufacturing Coach/Six Sigma Master Black Belt, Van Dyke Transmission Plant, Ford Motor Company, Michigan, USA

## IEOM-FlexSim Student Simulation Competition Chair ([See details in the simulation competition page](#))

- David Chan, Advent2 Labs, Singapore

---

## Website Coordinators

- Christian Forrest, Manager of Web Services, Lawrence Technological University, Michigan, USA
- Suvro Sudip, Michigan, USA

## Conference Secretariat

- Dr. Taufiquel Islam, Operations Manager, IEOM Society International

---

# Regional Academic Committee

- Prof. Rene Estember, Mapua University, Philippines
- Dr. Rosemary Seva, De La Salle University – Manila, Philippines
- Ma. Janice J. Gumasing, School of Industrial Engineering and Engineering Management, Mapua University, 658 Muralla St., Intramuros, Manila, 1002, Philippines
- Rex Aurelius C. Robielos, School of Industrial Engineering and Engineering Management, Mapua University, Intramuros, Manila, Philippines
- Yoshiki B. Kurata, Department of Industrial Engineering, Technological Institute of the Philippines, Quezon City, Philippines
- Mohammad Yeakub Ali, University Technology Brunei
- Dr. Md. Mizanur Rahman, University Technology Malaysia (UTM), Johor Bahru, Malaysia
- Dr. Abdul Talib Bon, Professor of Technology Management, UTHM, Malaysia
- Dr. Jafri Mohd Rohani, Universiti Teknologi Malaysia
- Dr. Mehran Doulat: Xiamen University, Sepang, Selangor, Malaysia
- Dr. Wichai Chattinnawat, Chiang Mai University, Thailand
- Professor Dr. Parames Chutima, Director – Regional Centre for Manufacturing Systems Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok, Thailand
- Dr. Paveena Chaovalitwongse, Head of IE Department, Faculty of Engineering, Chulalongkorn University, Phayathai Road, Bangkok, Thailand
- Tuangyot Supeekit, Industrial Engineering Dept., Mahidol University, Bangkok, Thailand
- Dr. Ganda Boonsothonsatit, Technopreneurship Program, Institute of Field roBOTics, King Mongkut's University of Technology Thonburi, Thailand
- Dr. Mohammed Iqbal, Shahjalal University of Science and Technology, Sylhet, Bangladesh
- Prof. Dr. Mohammad Sarwar Morshed, AUST, Bangladesh
- Dr. A R M Harunur Rashid, IUT, Gazipur, Bangladesh
- Prof. Dr. Md. Haider Ali Biswas, Khulna University, Bangladesh
- Dr. John Pumwa, Professor and Head of Mechanical Engineering Department, PNG University of Technology, Papua New Guinea
- Dr. Cecilia Nembou, Divine Word University, Papua New Guinea
- Dr. Kamalakanta Muduli, Associate Professor, Mechanical Engineering Department, Papua New Guinea University of Technology, Morobe Province, Papua New Guinea
- Dr. Asela K. Kulatunga, University of Peradeniya, Sri Lanka
- Dr. Dinusha Gamage, University of Moratuwa, Sri Lanka

- Ruwan Wickramarachchi, University of Kelaniya, Ambalangoda, Sri Lanka
- Manish Agrawal, IIT Kharagpur, Kharagpur, West Bengal, India
- Aalok Kumar, IIT Roorkee, Roorkee, India
- Prof. Shekar Babu PhD, Founding Head, AMRITA Vishwa Vidyapeetham, Bengaluru, India
- Dr. V Vasu, Associate Professor, Dept. of Mechanical Engineering, National Institute of Technology (NIT), Warangal, India
- Prof. RRK Sharma, Professor in Industrial and Management Engineering, Indian Institute of Technology, Kanpur (IITK), India
- Dr. Qutubuddin S.M., Associate Professor, Industrial & Production Engineering Department, P.D.A. College of Engineering, Gulbarga, Karnataka, India
- Prof. Sukhjeet Singh, Assistant Professor, Department of Mechanical Engineering, Guru Nanak Dev Engineering College, Ludhiana, Punjab, India
- Dr. M. Pratibha, Department of Humanities & Social Sciences, Vidya Jyothi Institute of Technology, Telangana, India
- Dr. Ghulam Yasin Shaikh, Department of Industrial Engineering & Management, Mehran University of Engineering and Technology, Jamshoro, Sindh, Pakistan
- Dr. Shazia Nauman, Associate Professor and Head of Department, Riphah School of Business & Management, Riphah International University, Lahore, Pakistan
- Prof. Dr. Muhammad Saad Memon, Assistant Professor, Department of Industrial Engineering and Management, Mehran University of Engineering and Technology, Jamshoro, 76062, Sindh, Pakistan
- Dr. Sadaf Zahoor, Assistant Professor, Department of Industrial and Manufacturing Engineering, University of Engineering and Technology, Lahore, Pakistan
- Dr. Daniel Tuladhar, Associate Professor, Department of Mechanical Engineering, Kathmandu University, Nepal
- D.R. Bhandari, Faculty – Statistics and Research Methodology, Tribhuvan University, Nepal Commerce Campus, Nepal
- Dr. Govinda Tamang, Associate Professor, Central Department of Management, Tribhuvan University, Nepal
- Norden Wangchuk, Head of Department, Department of Mechanical Engineering, The Jigme Namgyel Engineering College (JNEC), Royal University of Bhutan
- Hassan Shiraz, HOD – Department of Engineering, Faculty of Engineering, Science and Technology, The Maldives National University (MNU), Male, Maldives
- Dr. Nguyễn Văn Hợp, Dean, School of Industrial engineering and management, International University – Vietnam National University of HCMC, Ho Chi Minh City, Vietnam
- Thi Huynh Anh Le, Faculty of Project Management, The University of Danang, University of Science and Technology, Vietnam
- Dr. Ho Thanh Phong, International University – VNUHCM, Vietnam
- Assoc. Prof. Korakan PASOMSOUK, Head, Department of Mechanical Engineering, Sokpaluang Campus, Faculty of Engineering, National University of Laos
- Prof. Tak KEAN, Vice Rector at Royal University of Phnom Penh, Cambodia
- Dr. Kinnalesh Vongchanh, Researcher at Institute of Technology of Cambodia
- Dr. James C. Chen, Department of Industrial Engineering and Engineering Management, Faculty of Technology, National Tsing-Hua University (NTHU), Taiwan
- Dr. Chen-Fu Chien, Tsinghua Chair Professor, Department of Industrial Engineering & Engineering Management, National Tsing Hua University, Hsinchu, Taiwan
- Dr. Rumi Tobita, Ashikaga University, Tochigi, Japan
- Dr. Hiroyuki Goto, Hosei University, Tokyo, Japan
- Dr. Suk-Hwan Suh, Professor and Director of Center for Ubiquitous Manufacturing, Founding Dean of Graduate School of Engineering, POSTECH: Pohang University of Science and Technology, Pohang, South Korea
- Dr. Jinwoo Park, Professor, Department of Industrial Engineering, Seoul National University, South Korea
- Dr. Seong Jun Kim, Dept. of Industrial & Management Engineering, Gangneung-Wonju National University, South Korea
- Dr. Mesbahuddin Chowdhury, University of Canterbury, New Zealand
- Dr. Mi Sandar Mon, Professor and Head of Mechanical Engineering Department, Yangon Technological University, Yangon, Myanmar
- Dr. Win Pa Pa Myo, Professor & Head of Department of Mechanical Engineering, Mandalay Technological University, Patheingyi, Mandalay, Myanmar
- Mário Cabral, Department of Engineering, National University of East Timor, Dili, East Timor
- Hayatullah Mushwani, Lecturer at Kabul University (KU), Afghanistan
- Zumrat Gaibullaeva, Tajik Technical University, Tajikistan
- Professor Coskan Ilicali, Dean, Faculty of Engineering, Turkey Manas University, Kyrgyzstan
- A.M. Pendzhiev, Turkmen Polytechnical Institute, Kotovskogo, Turkmenistan
- D.M. Mukhammadiev, Urazbayev Institute of Mechanics and Seismic Stability of Structures, Academy of Sciences of the Republic of Uzbekistan, Tashkent, Uzbekistan

- N.M. Rasulov, Azerbaijan Technical University, Baku, Azerbaijan
- M. Lei, School of Economic and Management, Inner Mongolia University of Science and Technology, Baotou, Inner, Mongolia
- Dr. Gulnara Abitova, Professor, Eurasian National University, Kazakhstan
- Dr. Jihong Yan, Professor in Industrial Engineering and Deputy Dean of School of Mechatronics Engineering, Head of intelligent Manufacturing Scientific Research Team, Harbin Institute of Technology, Harbin, China
- Dr. Budi Santosa, Professor at Industrial Engineering, Institut Teknologi Sepuluh Nopember, Surabaya, East Java, Indonesia
- Prof. Dr. Abdul Hakim Halim, Industrial Engineering, Institut Teknologi Bandung, Indonesia
- Dr. Paulina Kus Ariningsih, Industrial Engineering Department, Faculty of Industrial Technology, Parahyangan Catholic University (UNPAR), Bandung, West Java, Indonesia
- Siti Mahsanah Budijati, Department of Industrial Engineering, Universitas Ahmad Dahlan, Yogyakarta, Indonesia
- Dr. Ho Hwi Chie, Dean, Binus Aso School of Engineering, Bina Nusantara University (Binus), Tangerang, Banten, Indonesia
- Dr. Naniek Utami Handayani, Department of Industrial Engineering, Diponegoro University, Semarang, Central Java, Indonesia
- Dr. Zulfa Fitri Ikatinasari, School of Industrial Engineering, Mercu Buana University, Jakarta, Indonesia
- Dr. Sawarni Hasibuan, School of Industrial Engineering, Mercu Buana University, West Java, Indonesia
- Dr. R. Eddy Nugroho, School of Industrial Engineering, Mercu Buana University, Jakarta, Indonesia
- Dr. Eng. Muhammad Rusman, Head of Industrial Engineering Department, Hasanuddin University, Makassar, South Sulawesi, Indonesia
- Dr. Docki Saraswati, Industrial Engineering, Universitas Trisakti, Jakarta, Indonesia
- Dr. Tanika D Sofianti, Industrial Engineering Dept., Engineering Faculty, Swiss German University BSD City Kav. Tangerang, Banten, Indonesia
- Dr. Subagyo, Associate Professor, Mechanical & Industrial Engineering Department, Universitas Gadjah Mada, Yogyakarta, Indonesia
- Prof. Dr. Sudradjat Supian, Dean of Faculty of Mathematics and Natural Sciences (FMIPA), Universitas Padjadjaran, West Java, Indonesia
- Dr. Sugiono, Universitas Brawijaya, Kota Malang, Jawa Timur, Indonesia
- Dr. Ishardita Pambudi Tama, Head of Industrial Engineering Department, Universitas Brawijaya, Malang – Indonesia
- Dr. Agus Ulinuha, Head, Institute for Research and Community Service (LPPM), Universitas Muhammadiyah Surakarta, Jawa Tengah, Indonesia
- Dr. Gede Agus Widyadana, Industrial Engineering Department, Petra Christian University, Surabaya, Indonesia
- Dr. Hari-Agung Yuniarto, Researcher in Maintenance and Quality System Engineering, Universitas Gadjah Mada (UGM), Yogyakarta, Indonesia
- Prof. Dr. Ir. T. Yuri M. Zagloel, Head of Industrial Engineering Department, University of Indonesia

---

## Honorary Committee

- Pr. Moulay Larbi Abidi, Director, École Mohammadia d'ingénieurs (EMI), Rabat, Morocco
- Dr. Hesham Kamal Al-Fares, King Fahd University of Petroleum and Minerals, Saudi Arabia
- Dr. Hamidi Bashir, Department of Industrial and Engineering Management, University of Sharjah, UAE
- Dr. Mohamed Essaaidi, Professor and Director (Dean), ENSIAS College of Engineering – Mohamed V University in Rabat, Morocco
- Dr. Devashis Mitra, Dean – Faculty of Business Administration, University of New Brunswick, Fredericton, Canada
- Prof. Dr. Mohd Razali Muhamad, Deputy Vice Chancellor (Academic and Internationalization), Universiti Teknikal Malaysia Melaka
- Professor Dr. Norazman Mohamad Nor, Deputy Vice Chancellor (Research and Innovation), National Defence University of Malaysia in Kuala Lumpur
- Dr. Hamid R. Parsaei, Associate Dean for Academic Affairs, Texas A&M University at Qatar and Professor of Industrial and Systems Engineering, Texas A&M University
- Dr. Ismail Tag, SVP & Provost, The Petroleum Institute, Abu Dhabi, United Arab Emirates
- Dr. Noordin Mohd. Yusof, Dean, Faculty of Mechanical Engineering, Universiti Teknologi Malaysia

---

## Advisory Committee

- Pr. Moulay Larbi Abidi, Director, École Mohammadia d'ingénieurs (EMI), Rabat, Morocco

- Dr. Muhammad Abid, Ghulam Ishaq Khan Institute of Engineering Sciences & Technology, Pakistan
- Dr. Olufemi Adetunji, University of Pretoria, South Africa
- Dr. Umar AL-Turki, King Fahd University of Petroleum and Minerals, Saudi Arabia
- Dr. Ronald G. Askin, Arizona State University, USA
- Dr. Shekar Babu, Founding Head, AMRITA School of Business, Bangalore, India
- Dr. Mohammed Ben-Daya, King Fahd University of Petroleum and Minerals, Saudi Arabia
- Dr. Abdul Talib Bon, Universiti Tun Hussein Onn Malaysia
- Dr. Raj Das, University of Auckland, New Zealand
- Dr. Kudret Demirli, Khalifa University, Abu Dhabi, UAE
- **Dr. Jose Arturo Garza-Reyes, University of Derby, UK**
- Dr. Alireza Ghasemi, Dalhousie University, Halifax, NS, Canada
- Dr. Moncer Abdelhamid Hariga, American University of Sharjah, United Arab Emirates (UAE)
- Dr. Mohammad D. Al-Tahat, The University of Jordan, Amman, Jordan
- Dr. Arun Kumar, Royal Melbourne Institute of Technology (RMIT) University, Australia
- Dr. Jay Lee, University of Cincinnati, USA
- Masaru Tezuka, Hitachi Solutions East Japan, Ltd., Sendai, Japan
- Dr. Abu Masud, Wichita State University, Kansas, USA
- Dr. Charles Mbohwa, University of Johannesburg, South Africa
- Dr. Samar Mukhopadhyay, GSB-Sung Kyun Kwan University, Seoul, Korea
- Dr. Nor Hasni Osman, Universiti Utara Malaysia
- Dr. Leonard Perry, University of San Diego, USA
- Dr. Ho Thanh Phong, International University – VNUHCM, Vietnam
- Dr. Yassine Ouazene, University of Technology of Troyes, France
- Dr. Abdur Rahim, University of New Brunswick, Canada
- Dr. Jafri Mohd Rohani, Universiti Teknologi Malaysia
- Dr. Mehmet Savsar, Kuwait University, Safat, Kuwait
- Dr. Rapinder Sawhney, University of Tennessee – Knoxville, USA
- Dr. Rosemary Seva, De La Salle University – Manila, Philippines
- Dr. Devdas Shetty, University of Hartford, Connecticut, USA
- Dr. Hamid Seifoddini, University of Wisconsin-Milwaukee, USA
- Dr. Alfredo Soeiro, University of Porto, Portugal
- Dr. Robert de Souza, The Logistics Institute – Asia Pacific, Singapore
- Dr. Masine Md. Tap, Universiti Teknologi Malaysia
- Dr. Zulkifli Mohamed Udin, Universiti Utara Malaysia
- Dr. Alok Verma, Old Dominion University, Norfolk, Virginia, USA
- Dr. Venkata Seshachala Sarma Yadavalli, University of Pretoria, South Africa
- Dr. Hari Agung Yuniarto, Universitas Gadjah Mada, Indonesia
- Dr. Li Zheng, Tsinghua University, China
- Dr. Henk Zijm, Dutch Institute for Advanced Logistics, University of Twente, Netherlands

---

## Global Engineering Education Committee

- Dr. Abu Masud, Wichita State University, Kansas, USA (**Chair**)
- Dr. Hamid Parsaei, Texas A&M University (College Station) and Texas A&M University, Qatar (**Co-Chair**)
- Dr. Mukondeleli Grace Kanakana, Executive Dean, Faculty of Engineering and the Built Environment, Tshwane University of Technology, Pretoria, South Africa
- Dr. Syed Ahmad Helmi Al Haddad, Program Coordinator for MSc in Industrial Engineering and Associate Fellow, Center for Engineering Education (CEE), Universiti Teknologi Malaysia, Skudai, Johor, Malaysia
- Dr. Mehmet Savsar, Professor, Department of Industrial and Management Systems Engineering, Kuwait University, Safat, Kuwait
- Dr. Vitor M. Caldana, Professor, Depto. de Eletroeletrônica, IFSP – Instituto Federal de São Paulo – Campus Sorocaba, Santana de Parnaíba, SP, Brazil
- Dr. Jafri Mohd Rohani, Universiti Teknologi Malaysia
- Dr. Chan Chee-Ming, Associate Professor and Deputy Dean (Academic and Research), Universiti Tun Hussein Onn Malaysia
- Dr. Ilham Kissani, Faculty of Engineering & Management Science, Al Akhawayn University, Ifrane, Morocco
- Dr. Ho Hwi Chie, Bina Nusantara University (Binus), Indonesia

- Dr. Rosemary Seva, De La Salle University – Manila, Philippines
- Dr Hannelie Nel, Senior Lecturer, Postgraduate School of Engineering Management, Faculty of Engineering and the Built Environment, University of Johannesburg, South Africa
- Dr. Jihong Yan, Professor in Industrial Engineering and Deputy Dean of School of Mechatronics Engineering, Head of intelligent Manufacturing Scientific Research Team, Harbin Institute of Technology, Harbin, China

### Program Committee

- Dr. M. Khadem, Sultan Qaboos University, Muscat, Oman
- Dr. Abdul Talib Bon, Universiti Tun Hussein Onn Malaysia
- Dr. Rushan Ziatdinov, Department of Industrial & Management Engineering, Keimyung University, Daegu, South Korea
- Dr. Lina Aboueljinane, Industrial Engineering Program, École Nationale Supérieure des Mines de Rabat (ENSMR), Morocco
- Dr. Bouloiz Hafida, Industrial Engineering Department, National School of Applied Sciences (ENSA), Ibn Zohr University, Agadir, Morocco
- Dr. Jaouad Boukachour, Université Le Havre, France
- Ms. Rocksana Ahmed, Senior, Engineering Technology, Lawrence Technological University, Southfield, Michigan, USA

### Industry 4.0 / Industry Solutions Committee

- Ms. Letci Truc Dao from Afnor Vietnam
- Dr. Zeki Ayağ, Kadir Has University, Turkey
- Amine Belhadi, Industrial Engineering Research Team, Higher School of Technology, Safi, Cadi Ayyad University, Marrakech, Morocco
- Navpreet Singh Chandok, O2i Technologies, India
- Dr. Rahul Chougule, Caterpillar India Pvt Ltd, Bangalore, India
- Sameh Moh. Nour El-Din A-Razek, Al Ezz Dekheila Steel Co., Alexandria, Egypt
- Abdullah Y Dhafer, Aramco, Saudi Arabia
- Natasha Dzulkarnain, Construction Research Institute of Malaysia (CREAM)
- Dr. Kenichi Funaki, Hitachi, Yokohama, Japan
- Dr. Adel Hejaaji, Engineering Services Management (ESM) Limited, Essex, UK
- Dr. Anwar Hossain, Daikin Applied, Minneapolis, Minnesota, USA
- Ihfasuziella Ibrahim, Construction Research Institute of Malaysia (CREAM)
- Hwa Kooi Kok, Intel Malaysia
- Ali Massaeli, National Iranian Gas Company, Iran
- Bob Mathur, Sr. Project Manager, Phillips 66 Refinery (Exxon), Linden, NJ, USA
- German Moya, President at IEEE Costa Rica Section, Costa Rica
- Paul Moore, International Mining, England, UK
- Dr. Gerard O'Connor, Adelaide and Meath Hospital, Dublin, Ireland
- Dr. Banu Ozkeser, Istanbul, Turkey
- Dr. Sushil K. Shetty, Wilsonart LLC, Temple, Texas, USA
- Masaru Tezuka, Hitachi Solutions East Japan, Ltd., Japan
- Nesreen M. Abdelghafar, Mechanical Engineering Department, Assiut University, Egypt

### Women in Industry and Academia (WIIA) Committee

- Resh Plaha, Crystal Quality, UK
- Dr. Chan Chee-Ming, Associate Professor and Deputy Dean (Academic and Research), Universiti Tun Hussein Onn Malaysia
- Dr. Mey Goh, Assoc Professor in Product Design, Loughborough University, UK
- Dr. Ilham Kissani, Faculty of Engineering & Management Science, Al Akhawayn University, Ifrane, Morocco
- Dr. Stefanie Pillai, Dean and Associate Professor, Faculty of Languages & Linguistics, University of Malaya, Kuala Lumpur, Malaysia
- Dr. Funda Sivrikaya Şerifoğlu, Bilgi University, Istanbul, Turkey
- Dr. Adibah Shuib, Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA, Malaysia
- Dr. Vanajah Siva, Chalmers University, Sweden
- Vanessa Victoire, University of Mauritius



- Prof. Soumaya Yacout, École Polytechnique de Montréal, Canada
- Dr. Docki Saraswati, Universitas Trisakti, Jakarta, Indonesia
- Dr. Ho Hwi Chie, Bina Nusantara University (Binus), Indonesia
- Nesreen M. Abdelghafar, Mechanical Engineering Department, Assiut University, Egypt
- Dr. Hannelie Nel, Senior Lecturer, Postgraduate School of Engineering Management, Faculty of Engineering and the Built Environment, University of Johannesburg, South Africa

---

## Technical Committee / Reviewers

- Dr. Zhiwei Gao, Associate Professor, Department: Mathematics, Physics and Electrical Engineering, Northumbria University, UK
- Prof. Rene Estember, Mapua University, Philippines
- Dr. A.O. Adewumi, University of KwaZulu-Natal, South Africa
- Dr. Kondo H. Adjallah, Paul-Verlaine University, France
- Dr. Abdollah Aghaie, K.N. Toosi University of Technology, Iran
- Dr. Abdul-Rahman Al-Ali, American University of Sharjah, United Arab Emirates
- Gasim Al-Hawarii, Senior Fleet Management Engineer, Dubai Municipality, United Arab Emirates
- Ali I. Al-Mosawi, Miskolc University, Faculty of Materials Science and Engineering, Hungary
- Dr. Fernando González Aleu, Departamento de Ingeniería, Universidad de Monterrey, Mexico
- Dr. Kuchkarov Atamurat, Uzbekistan National University, Uzbekistan
- Dr. Faieza Abdul Aziz, Universiti Putra Malaysia, Selangor, Malaysia
- Dr. Amir Azizi, Universiti Malaysia Pahang, Malaysia
- Amine Belhadi, Industrial Engineering Research Team, Higher School of Technology, Safi, Cadi Ayyad University, Marrakech, Morocco
- Dr. Behnam Bahrami, Eastern Mediterranean University, Famagusta, Cyprus
- Dr. D. K. Banwet, IIT-Delhi, India
- Dr. Abdelaziz Berrado, The Ecole Mohammadia d'Ingénieurs (EMI), Rabat, Morocco
- Dr. Mahdi Bashiri, Shahed University, Iran
- Dr. Vladimir Beresnev, Sobolev Institute of Mathematics, Russia
- Dr. Haider Ali Biswas, Khulna University, Bangladesh
- Dr. Miguel Sanz Bobi, Comillas Pontifical University, Spain
- Dr. Nejib Chouaibi, Polytechnic School of Tunisia, Tunisia
- Dr. Mohammad Ishak Desa, Universiti Teknologi Malaysia, Johor Bahru, Malaysia
- Dr. Mehran Doulat, Center for Quality and Sustainability, School of Engineering and Advanced Technology, UTM Kuala Lumpur, Malaysia
- Dr. Omar Elmabrouk, Benghazi University, Libya
- Dr. Dinusha Gamage, University of Moratuwa, Sri Lanka
- Dr. Rodrigo Garrido, Universidad Adolfo Ibaez, Chile
- Dr. Vassilis Gerogiannis, Department of Project Management, Greece
- Dr. Jahara bint Ghani, UKM, Malaysia
- Dr. Salah Haridy, Department of Industrial Engineering and Engineering Management, University of Sharjah, Sharjah, UAE
- Dr. Ravi Gor, St. Kabir Institute of Professional Studies, Ahmedabad, India
- Dr. Kannan Govindan, University of Southern Denmark, Denmark
- Dr. Indra Gunawan, The University of Adelaide, Australia
- Dr. Md. Mamun Habib, Brac University, Bangladesh
- Dr. Ramy Harik, University of South Carolina, USA
- Dr. Maruf Hasan, University of New South Wales, Australia
- Dr. Ahmed Kadhim Hussein, Babylon University, Iraq
- Dr. Md. Abdus Samad Kamal, Monash University, Sunway Campus, Malaysia
- Dr. Javad Khamisabadi, Islamic Azad University, Tehran, Iran
- Dr. Raja Kothandaraman, Alpha College of Engineering, Chennai, Tamilnadu, India
- Dr. Brigitte Jaumard, Concordia University, Canada
- Dr. Rashmi Jha, Gitanatan International Business School (GIBS), Affiliated to Guru Gobind Singh Indraprastha University, New Delhi, India
- Dr. Shahrul B. Kamaruddin, Universiti Sains Malaysia
- Prof. Dr. Anand Kumar, M.S. Engineering College, Bangalore Karnataka, India
- Dr. Nani Kurniati, Institute of Technology Sepuluh Nopember (ITS), Surabaya, East Java, Indonesia

- Dr. Francis Leung, City University of Hong Kong, China
- Dr. Motah Mahendrenath, University of Technology, Mauritius
- Dr. Boudouda Malik, University of Champagne-Ardenne, France
- Dr. Ilias Mamat, Quest International University Perak, Ipoh, Perak, Malaysia
- Dr. Fulufhelo Masithulela, University of South Africa, Johannesburg, South Africa
- Dr. Abderrahmane Mellak, University of Boumerdes, Algeria
- Dr. Yuan Xue Ming, SIMTech: Singapore Institute of Manufacturing Technology, Singapore
- Dr. Ruchi Mishra, Institute of Management, Nirma University, Ahmedabad, India
- Dr. Vladimir Modrak, TUKE, Slovakia
- Dr. Norhamidi Muhamad, UKM, Malaysia
- Dr. Michael Mutingi, University of Botswana, Botswana
- Dr. Arun N. Nambiar, California State University – Fresno, USA
- Dr. Cecilia Nembou, Divine Word University, Papua New Guinea
- Dr. Sawat Pararach, Thammasat University, Thailand
- Dr. Ratri Parida, National Institute of Construction Management and Research (NICMAR), Pune, Maharashtra, India
- Dr. Eui H. Park, North Carolina A&T State University, USA
- Dr. Md. Mizanur Rahman, Universiti Malaysia Sabah (UMS), Kota Kinabalu, Sabah, Malaysia
- Dr. T. Ramayah, School of Management, Universiti Sains Malaysia
- Dr. Raja Zuraidah Raja Mohd Rasi, Universiti Tun Hussein Onn Malaysia
- Dr. Bhuvnesh Rajamony, University Malaysia Perlis (UniMAP), Malaysia
- Dr. Ramakrishnan Ramamoorthy, Yanbu Industrial College, Yanbu, Saudi Arabia
- Dr. Mohd Abdur Rashid, University Malaysia Perlis (UniMAP), Malaysia
- Dr. Syed Asif Raza, Qatar University, Qatar
- Dr. Nubia Milena Velasco Rodriguez, Universidad de Los Andes, Colombia
- Dr. P. Sanjeevikumar, Dublin Institute of Technology, Ireland
- Dr. Mahmood Shafiee, Cranfield University, Bedfordshire, United Kingdom
- Dr. Sharan Shetty, School of Management & Business, Manipal International University, Putra Nilai, Malaysia
- Dr. Abdussalam Shibani, Coventry University, UK
- Dr. Sarbjit Singh, National Institute of Technology, Jalandhar, Punjab, India
- Dr. Shahryar Sorooshian, University Malaysia Pahang, Malaysia
- Dr. Jayakanth Srinivasan, MIT Sloan School of Management
- Dr. Gopalan Srinivasan, University of New Brunswick, Canada
- Dr. Zuraidah Sulaiman, Universiti Teknologi Malaysia (UTM), Johor, Malaysia
- Dr. Balan Sundarakani, University of Wollongong in Dubai, UAE
- Dr. Murat Caner Testik, Hacettepe University, Ankara, Turkey
- Dr. Theodore B. Trafalis, University of Oklahoma, USA
- Dr. Vladimir I. Tsurkov, Russian Academy of Sciences, Moscow, Russia
- Dr. Hui-Ming Wee, Chung Yuan Christian University, Taiwan
- Dr. Yong Yin, Yamagata University, Japan
- Dr. Norzaidahwati Zaidin, Universiti Teknologi Malaysia, Johor, Malaysia\Dr. Suhaiza Hanim Zailani, University Malaya, Malaysia
- Dr. Linda L. Zhang, IESEG School of Management, Lille-Paris, France
- Dr. Suat Kasap, Industrial Engineering, American University of the Middle East, Kuwait
- Nesreen M. Abdelghafar, Mechanical Engineering Department, Assiut University, Egypt
- M Chairul Basrun Umanailo, University of Iqra Buru, Namlea, Maluku, Indonesia
- Ashish Dwivedi, Senior Research Fellow, Operations and Supply Chain Management, Indian Institute of Technology Delhi, New Delhi, India

---

## Editorial Board

- Dr. Ahad Ali
- Dr. Taufiq Islam
- Dr. Hayder Zghair
- Dr. Andy Padian
- Dr. Mizanur Rahman
- Dr. Anwar Rahman
- Professor Don Reimer

- Dr. Abdul Talib Bon
- Dr. Wahyudi Sutopo

# **Estimate the Location of Basaltic Intrusion in Karanglewas Village Jatilawang District Banyumas Regency Central Java Based on The Pseudogravity Anomaly Map**

**Sehah and Urip Nurwijayanto Prabowo**

Department of Physics, Faculty of Mathematics and Natural Sciences  
Jenderal Soedirman University  
Purwokerto, Central Java, Indonesia  
[sehah@unsoed.ac.id](mailto:sehah@unsoed.ac.id), [urip.nurwijayanto@gmail.com](mailto:urip.nurwijayanto@gmail.com)

**Abdul Talib Bon**

Department of Production and Operations  
University Tun Hussein Onn Malaysia  
Malaysia  
[talibon@gmail.com](mailto:talibon@gmail.com)

## **Abstract**

Estimation of the location of the basaltic intrusion in Karanglewas Village, Jatilawang District, Banyumas Regency has been carried out based on the pseudogravity anomaly map. The amount of data measured in the field is 239 data which stretches at  $109.107222^{\circ}$  –  $109.134944^{\circ}$  E and  $7.561361^{\circ}$  –  $7.577306^{\circ}$  S. After some corrections and reductions, local magnetic anomalies data were obtained with values of  $-2,961.11$  –  $1,516.31$  nT. Then these data were transformed into pseudogravity anomalies data, with values ranging from  $-115.938$  –  $124.286$  mGal. The transformation is carried out because the local magnetic anomaly map shows complex anomalies closures, making interpretation difficult. Based on the interpretation results of the pseudogravity anomaly contour map, basaltic rocks intrusion is interpreted to occur at the position of  $109.131225^{\circ}$  E and  $7.569342^{\circ}$  S in the form of a dyke structure. At this location point, the pseudogravity anomaly map shows the maximum value, i.e.  $124.286$  mGal. While to identify the distribution of basaltic intrusion on the surface, horizontal gradient analysis is applied to the pseudogravity anomalies data, so it can be obtained the basaltic rock distribution patterns oriented from west to east in accordance with the geological map of the research area.

## **Keywords**

Basaltic intrusion, pseudogravity anomaly, horizontal gradient, Karanglewas, Jatilawang.

## **1. Introduction**

Karanglewas is a village located in Jatilawang District, Banyumas Regency, Java, Indonesia. Geomorphologically, the research area is divided into two areas, i.e. the Karanglewas Anticline Ridge and the Jatilawang Alluvial Plateau. The stratigraphy of the study area is divided into five lithostratigraphic units, which are sandstones, claystones, tuffs, basalt, and alluvial deposits. The geological structure that develops in the research area is in the form of anticline folds that have a west-east direction and shear faults in a northwest-southeast direction. This shows that the stress that occurs in the research area has a north-south direction due to the subduction of the Indo-Australian Plate under the Java Island (Harsantosa 2013). The Karanglewas village has a large potential for subsurface natural resources, i.e. basaltic rock. Basaltic rock is extrusive igneous rock, that is volcanic rock formed due to freezing magma on the earth's surface with an alkaline composition. Basaltic rocks are generally relatively heavy, dark in color, contain lots of iron minerals, and a little silica mineral content. Basaltic rock is very well used for building materials because of its large density (Anonymous 2020). Figure 1 shows some basaltic rocks outcropped on the surface of Karanglewas Village, Jatilawang District, naturally and as a result of mining.



Figure 1 Basaltic rock outcrops in Karanglewas Village, Jatilawang District, Banyumas Regency, Central Java, Indonesia (personal documentation).

An effort to map the location and distribution of basaltic rocks intrusion in Karanglewas Village and surrounding is needed to formulate regulations governing rock mining because basaltic rock mining has begun to bloom in these areas. This mapping is also useful for localizing the distribution of basaltic rocks still very compact (high density), which can be used as a good building material. One of the geophysical techniques that can be applied for mapping basaltic rocks in an area is a magnetic survey (Adagunodo et.al. 2015). The magnetic survey has high sensitivity to identify and map basaltic rock distribution (Lino et al. 2018) so that basaltic rocks are easily detected, even though they are in the subsurface. This is related to the iron mineral content which tends to be ferromagnetic in the rock's bodies (Cyprian 2016). In processing and interpreting data, magnetic surveying has several advantages. One of the advantages is the presence of magnetic anomalies data filtering technique which are quite varied so that the magnetic anomalous sources in the subsurface that are the research targets can be interpreted easily either in qualitative and quantitative (Ansari and Alamdar 2009).

Based on the geological information as shown in Figure 2, basaltic intrusions were found in the form of dykes and sills in the research area (Asikin et.al. 1992). A dike is a sheet of rock that is formed in the fracture in a pre-existing rock body. Dike can be either magmatic or sedimentary in origin. Magmatic dikes are formed when magma intrudes into a crack then freezes in the form of a sheet intrusion, either cutting across layers of rock or through an unlayered mass of rock. While a sill is a tabular sheet intrusion that has intruded between older layers of sedimentary rock, beds of volcanic lava or tuff, or even along the direction of foliation in metamorphic rock. The basaltic intrusion spread pattern seen on the Geological Map indicates that this rock intrusion has appeared in the form of a dyke in the Karanglewas Village. Furthermore, the intrusions spread westward towards Pekuncen Village and its surroundings in the form of a sill. Therefore, this research purposes to estimate the location of basaltic intrusion in the form of dyke based on the interpretation results of the pseudogravity anomaly map and its distribution patterns based on the result of analysis of its horizontal gradient. One of the expected benefits of the research is to assist the local governments in drafting regulations related to rock mining activities, particularly the provision of research data.

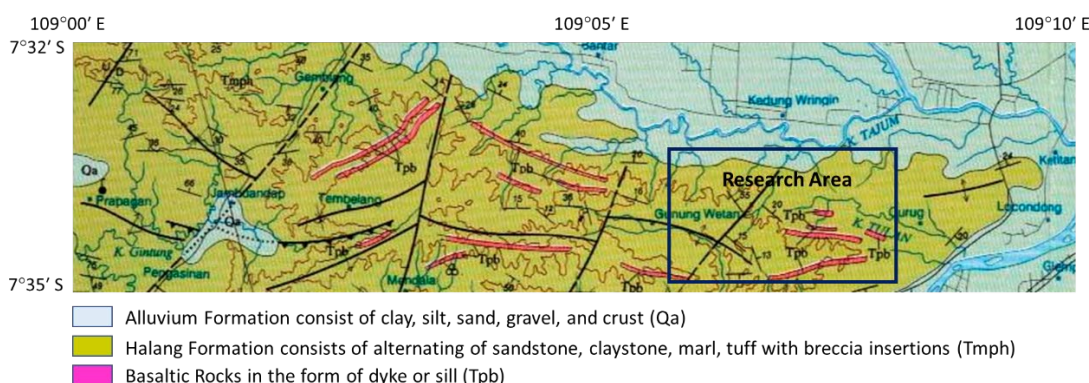


Figure 2 The geological map of the research area (Asikin et.al. 1992).

## 2. Literature Review

Magnetic anomaly is a magnetic field that comes from the distribution of magnetized subsurface rocks or magnetic minerals. A volume consisting of magnetic materials can be assumed as a magnetic dipole as shown in Figure 3. The magnetization that occurs in these materials depends on the magnetic induction that is received from the earth's main magnetic field (Telford et.al. 1990). The magnetic potential across the volume can be formulated by the equation:

$$V(\vec{r}_0) = -C_m M \frac{\partial}{\partial \alpha} \int \left[ \frac{dV}{|\vec{r}_0 - \vec{r}|} \right] \quad (1)$$

$M$  is the magnetic dipole moment per unit volume and  $C_m$  is a constant. The total magnetic induction of the rock can be formulated (Telford et.al. 1990):

$$\vec{B}(\vec{r}_0) = C_m \nabla \int_V \vec{M}(\vec{r}) \cdot \nabla \left[ \frac{1}{|\vec{r}_0 - \vec{r}|} \right] dV \quad (2)$$

The total magnetic induction as referred to in equation (2) is referred to as a magnetic anomaly that superposes the main magnetic field of the earth ( $B_0$ ) at all measurement points on the earth's surface. Thus, the actual total magnetic field measured in the apparatus at a given location is a combination of the earth's main magnetic field ( $B_0$ ) and the magnetic field anomaly ( $B_{r0}$ ) assuming that the external magnetic field value is negligible so that the equation can be stated:

$$\vec{B}_T = \vec{B}_0 + \vec{B}(\vec{r}_0) \quad (3)$$

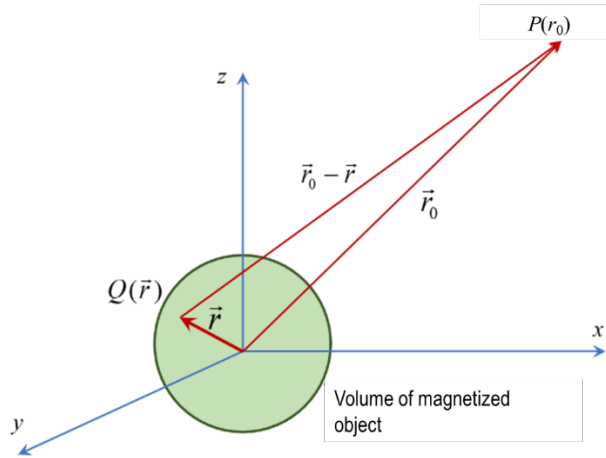


Figure 3 Magnetic anomalies from rocks or anomalous objects in the subsurface (Telford et.al. 1990).

In fact, to obtain the total magnetic anomaly data, it is necessary to make some corrections to the total magnetic field data measured at each location point on the earth's surface which includes daily correction ( $B_D$ ) to eliminate the influence of the external magnetic fields and IGRF correction to eliminate the influence of the earth's main magnetic field ( $B_0$ ). If the total magnetic anomaly can be symbolized by  $\Delta B$ , then (Sehah et.al. 2020):

$$\Delta B = B_T - B_D - B_0 \quad (4)$$

IGRF is an abbreviation for the-International Geomagnetic Reference Field which is the earth's main magnetic field. The IGRF value at each location point is not fixed, but changes according to the geographical position of the latitude and time. However, changes in the IGRF value have been anticipated through updating and setting the IGRF value regularly; i.e. once every five years (Chambodut 2015).

The dipole nature of the magnetic field causes the magnetic anomalous contour map to have many interpretations, so the interpretation process is sometimes difficult, especially for areas that are in low latitude zone such as Indonesia. Therefore, a data processing method is needed to reduce the effect of magnetic field dipoles, thereby facilitating the interpretation of magnetic anomaly data. One method that can be used for this purpose is pseudogravity method (Yolanda et al. 2018). The basic principle of the pseudogravity transformation can be stated in the Poisson relation. Based on equation (5), the Poisson relation shows that the magnetic potential  $V$  and the gravitational potential  $U$  originating from an object that has the same density and magnetization, which have a relationship (Blakely 1995):

$$V = -\frac{C_m}{\gamma} \frac{M}{\rho} \hat{m} \bullet \nabla_p U = -\frac{C_m}{\gamma} \frac{M}{\rho} g_m \quad (5)$$

where  $\rho$  is the density,  $M$  is the intensity of the magnetization,  $\hat{m}$  is the unit vector in the direction of magnetization and  $g_m$  is the component of the gravitational field in the direction of magnetization. To obtain a Poisson relation, it is assumed that  $M$  and  $\rho$  are constant (Blakely 1995).

The transformed pseudogravity anomaly map from magnetic anomaly data is relatively clear in showing the location of subsurface sources anomalous targets. However, to clarify the lithological contact boundaries of the anomalous sources in the subsurface, the horizontal gradient analysis can be applied to the pseudogravity anomaly data. The maximum horizontal gradient value will indicate a sudden lateral change in the direction of magnetization. Then the value of the horizontal gradient from the pseudogravity anomaly data can be stated as follows (Blakely 1995):

$$h(x, y) = \left[ \left( \frac{\partial g_z(x, y)}{\partial x} \right)^2 + \left( \frac{\partial g_z(x, y)}{\partial y} \right)^2 \right] \quad (6)$$

When applied to two-dimensional data interpretation, the horizontal gradient tends to occupy a narrow ridge above a sudden change in magnetization or density, as can be seen in Figure 4. This can be utilized to locate the lithological contact boundary of the source of an anomaly to its environment based on changes in density or magnetization which suddenly changes in a lateral direction.

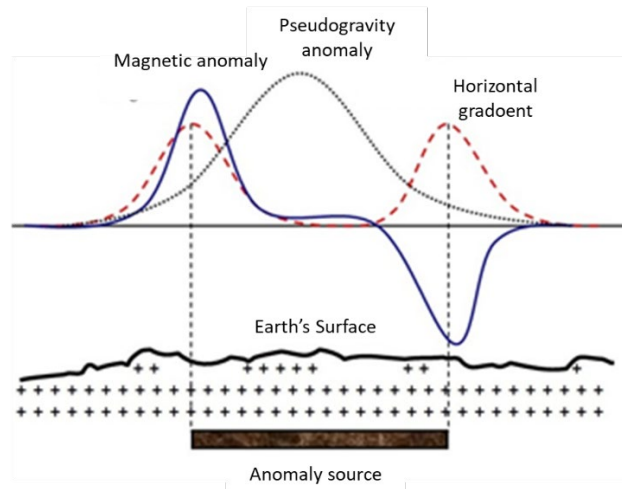


Figure 4 Magnetic anomaly, pseudogravity anomaly, and horizontal gradient curves models over a slab-shaped anomaly source in subsurface (Blakely 1995).

### 3. Methods

Magnetic data acquisition has been carried out in Karanglewas Village and it's surrounding, District of Jatilawang, Regency of Banyumas as shown in Figure 5. Magnetic data processing has been carried out at the Geophysical Laboratory, Faculty of Mathematics and Natural Sciences, Jenderal Soedirman University. The equipment used for data acquisition includes Proton Precession Magnetometer (PPM), Global Positioning System (GPS), compass, and several other supporting tools. The equipment used in the laboratory consists of a personal computer be equipped with various software. The data obtained from the acquisition in the field are the total magnetic field data which are distributed over all the location points. To obtain total magnetic anomalies data, some corrections are applied which include daily and IGRF corrections. The data obtained after corrections are total magnetic anomalies data which are distributed on the topographical surface. Therefore, these data are transformed into a horizontal surface using the Taylor Series approximation (Blakely 1995):

$$\Delta B(\lambda, \vartheta, h_0)^{[i+1]} = \Delta B(\lambda, \vartheta, h) - \sum_{n=0}^{\infty} \frac{(h-h_0)^n}{n!} \frac{\partial^n}{\partial z^n} \Delta B(\lambda, \vartheta, h_0)^{[i]} \quad (7)$$

where  $\Delta B(\lambda, \vartheta, h)$  is anomalies data which is still distributed on the topographic surface,  $\Delta B(\lambda, \vartheta, h_0)$  is anomalies data which has been distributed on a horizontal surface,  $h$  is the height of the data elevation, and  $h_0$  is the average height



of the topographical surface. After the total magnetic anomalies data are distributed on the horizontal surface, then the regional magnetic anomalies data are reduced from these data to obtain the local magnetic anomalies data, with the equation (Telford *et.al.* 1990):

$$\Delta B_{Lokal} = \Delta B(\lambda, \vartheta, h_0) - \frac{\Delta h}{2\pi} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \frac{\Delta B(\lambda', \vartheta', h_0)}{\sqrt{((\lambda' - \lambda)^2 + (\vartheta' - \vartheta)^2 + \Delta h^2)^{3/2}}} d\lambda' d\vartheta' \quad (8)$$

The rightmost term in equation (8) is an upward continuation process that produces regional anomaly data (Telford *et.al.* 1990). The local anomalies data obtained represents local geological structure or subsurface rock conditions in the research area (Sehah *et.al.* 2020).

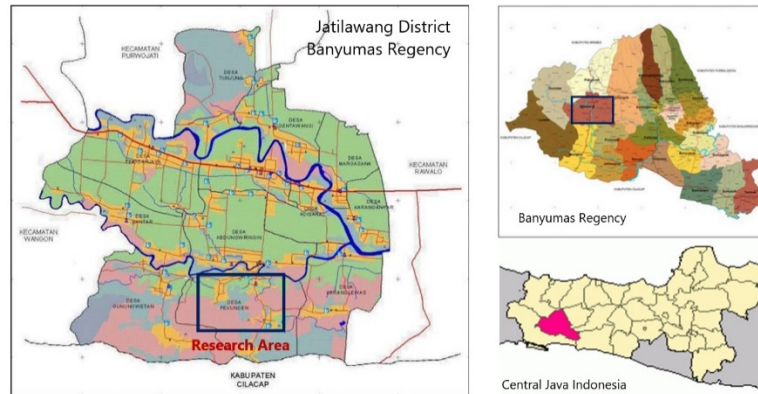


Figure 5 Research location; Karanglewas Village, Jatilawang District, Banyumas Regency and it's surrounding.

Further, the local magnetic anomalies data are then transformed into pseudogravity anomalies data, as described in the Literature Review section. Pseudogravity anomalous map associated with rock density is used to localize the basaltic rock zone in the research area (Pratt and Shi 2004). While horizontal gradient analysis can be applied to the pseudogravity anomalies data to clarify the location of the lithological contact boundaries of the subsurface rocks to the surrounding environment (Kusumah *et.al.* 2010). The lithological contact boundaries between several rocks are usually in the form of faults or boundaries between igneous rocks intrusions and surrounding sediment rocks. The equation for the horizontal gradient has been described in the Literature Review. The results can be used to interpret the spread pattern of basaltic rock intrusions in the research area.

#### 4. Data Collection

Data acquisition of total magnetic field strength in the research area is carried out on February 28 – March 6, 2020, at predetermined points with the same distance from one point to another. In the data acquisition, several data recorded include geographical position of the measuring points, measuring time, magnetic field strength, and environmental condition. Data measurement of the magnetic field strength has been carried out together with the geographical position data measurement of the measuring points using the Global Positioning System (GPS). The number of the total magnetic field strength data which have been successfully measured in the fields were 239 data stretching at the positions of 109.107222° – 109.134944° E and 7.561361° – 7.577306° S. The total magnetic field strength values obtained from measurements in the fields ranged of 41,804.58 – 46,719.76 nT. While the topography of the research area has an elevation ranging from 29.0 m – 232.0 m, with an average value of 102,69 m. Visually, the contour map of the topography of the research area which is overlaid with the position of the measuring points and the total magnetic field strength contour map can be seen in Figure 6. The total magnetic field strength data which are obtained from measurements in the field are a combination of the earth's main magnetic field, the external magnetic field, and the magnetic field originating from anomalous sources in the earth's crust. In magnetic surveying, magnetic anomalous sources are generally the target of research.



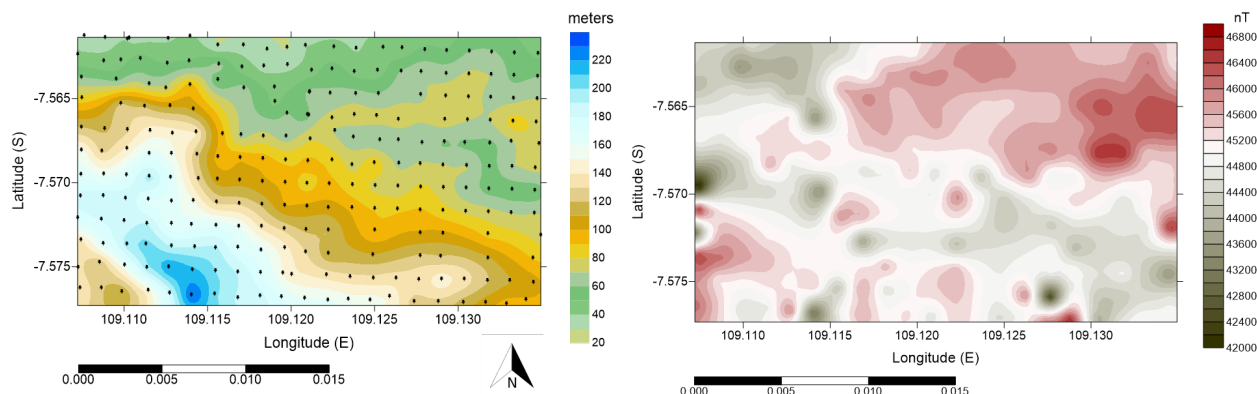


Figure 6 The topography of the research area contour map which overlaid with the position of the measuring points and the total magnetic field strength contour map.

## 5. Results and Discussion

The total magnetic field strength data are corrected by daily and IGRF corrections as described in the previous. After some corrections were applied, the total magnetic anomalies data were obtained with values ranging from  $-3,175.12$  –  $1,773.76$  nT. The total magnetic anomalies data are still distributed on the topographic surface, so the data cannot be processed mathematically at the next stage, because the data must be spread on a horizontal surface (Blakely 1995). One method that can be used to reduce the anomalies data from an uneven surface to a horizontal surface is through the Taylor Series approximation, as explained in the previous (Blakely 1995). Based on these data, it is known that the total magnetic anomalies data resulting from reduction to the horizontal surface are relatively more convergent than when the anomalies data are still distributed on the topography surface, with anomaly values ranging from  $-2,830.23$  –  $1,647.24$  nT. Visually, the total magnetic anomaly contour map that is still spread on the topographic surface and has been spread on the horizontal surface (average topographic height) can be seen in Figure 7.

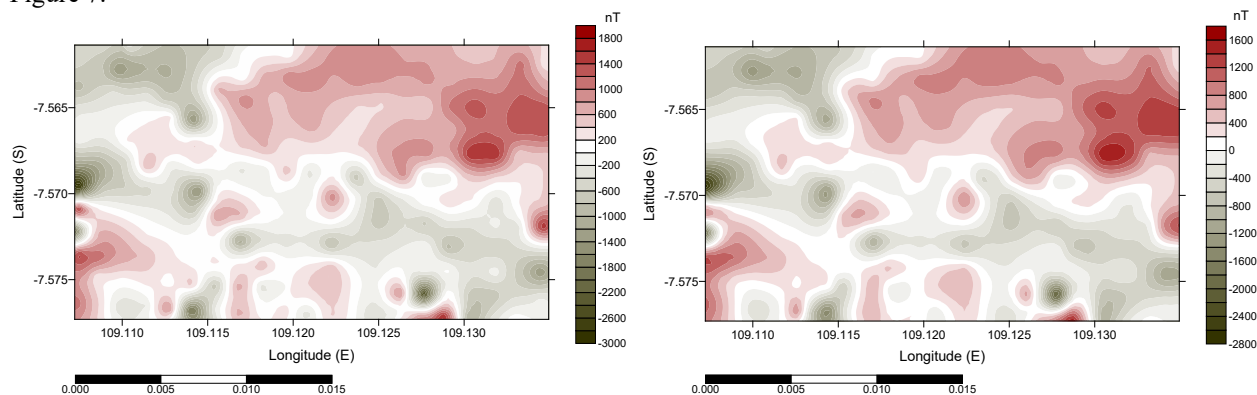


Figure 7 The total magnetic anomalous contour map that still spread on the topographic surface and has been spread on the horizontal surface (average topographic height).

The total magnetic anomaly data which has been distributed in the horizontal surface still superpose to the magnetic anomaly originating from very deep and wide sources, which are called the regional magnetic anomaly. Therefore the regional anomaly data must be reduced because the research target is local anomalous sources, i.e. basaltic rock intrusions. The regional magnetic anomalies can be obtained through an upward continuation of the total magnetic anomalies data which have been distributed on a horizontal surface up to a certain height. Upward continuation of anomalies data has been carried out until the anomaly contour pattern has shown a relatively constant or not change (Ilapadila et.al. 2019). Analysis result of the anomalous contour pattern after upward continuation shows that the magnetic anomaly contour map at a height of 3,500 m has shown a smooth pattern with a very small interval value, so that is stated as a regional magnetic anomaly. Visually, the magnetic anomalous contours patterns resulting from the upward continuation process from a height of 1,000 m to 3,500 m are shown in Figure 8.

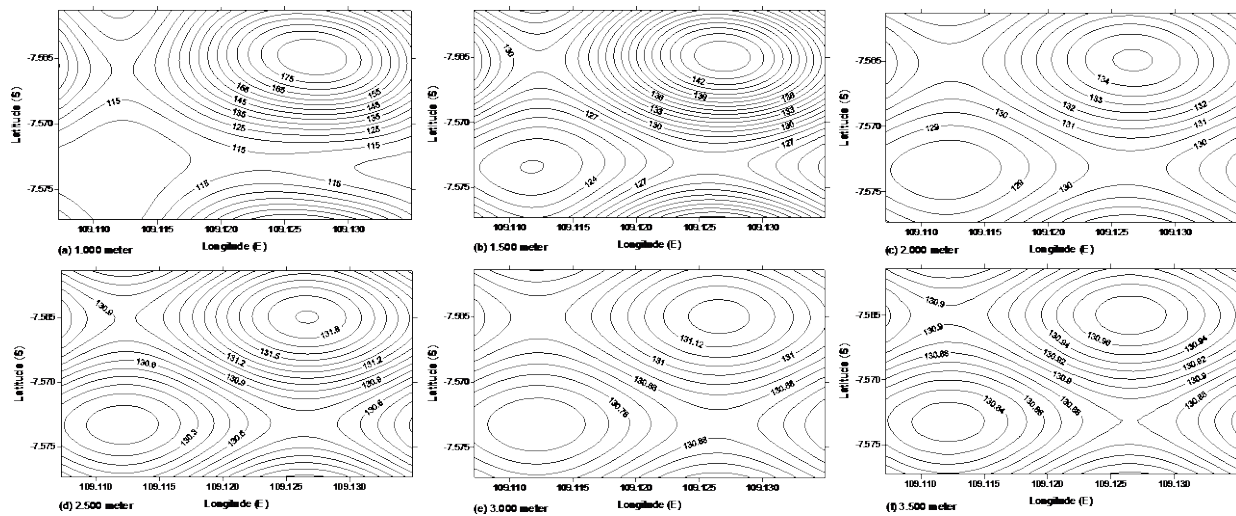


Figure 8 The magnetic anomalous contours maps resulting from upward continuation, where the magnetic anomaly contour map at a height of 3,500 m is stated as a regional anomaly.

Considering that the target of this research is to identify the location of basaltic intrusion and its distribution in the research area, then the contribution of the regional magnetic anomalies data must be reduced from the total magnetic anomalies data as described in the previous; because the target is assumed to be part of the local anomalous sources. The technique is the total magnetic anomalies data that have been distributed on the horizontal surface are corrected by the regional magnetic anomalies data. The data generated from this correction is referred to as the local magnetic anomalies data, with the contour map shown in Figure 9. The local magnetic anomalies data are at the same height as the total magnetic anomalies data on the horizontal surface; i.e. the average topographic height (102,69 m). The local magnetic anomalies data have values ranging from -2,961.11 – 1,516.31 nT, with data interval is relatively large. This can be attributed to a large number of basaltic intrusions in the subsurface (Quesnel et.al. 2008). Basaltic rocks have a large mineral composition, such as pyroxene, olivine, magnetite, ilmenite, plagioclase feldspar, and other minerals (The University of Auckland 2005). The presence of magnetite in the basaltic rocks is estimated to have contributed greatly to the high interval of the local magnetic anomaly value.

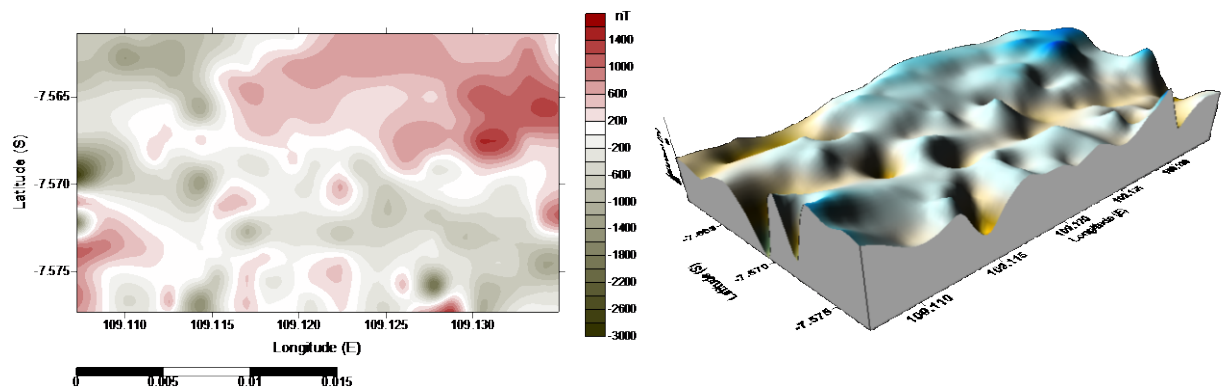


Figure 9 The 2D and 3D local magnetic anomalous contour maps of the research area are estimated to be directly associated with local anomalous sources in the subsurface.

Based on the local magnetic anomaly contour map as shown in Figure 9, the local magnetic anomalous sources tend to be scattered in the eastern of the research area; where the contour pattern shows strong positive and negative anomalous closures pairs. While in the west of this area there are also positive and negative anomalous closures pairs, but the closures are cut off by the boundaries of the research area, so they are not optimal in showing the sources of the subsurface anomalous. Around the magnetic anomalous closures pairs, there are generally anomalous

sources in the subsurface. Based on the geological information (**Figure 2**), the rock formations in the research area are dominated by the Halang Formation which is composed of alternating sandstones, claystones, marl, tuff with breccias (Asikin and Handoyo 1992). Therefore, the basaltic rock intrusion in the research area can be considered as a very strong anomaly source in the sedimentary rock area of the Halang formation and will be detected easily in the local magnetic anomaly contour map (Schah et al. 2020).

The local magnetic anomaly maps such as Figure 9 show complicated closures patterns, so that can complicate the interpretation of anomalies data. Meanwhile, the pseudogravity transformation has the characteristic of reducing shallow magnetic anomaly data and eliminating the polarity effect in magnetic data, thereby reducing the difficulty of the interpretation process. This technique is a qualitative interpretation method for determining subsurface targets (Yolanda et.al. 2018). The magnetic anomalies data that has been transformed into pseudogravity anomalies data show monopole-shaped closures with symmetrical patterns, i.e. a half-wave curve. The anomalous sources in the subsurface are considered to be right below the crest of the wave with the highest amplitude, similar to the gravity anomaly curve (Limbong et.al. 2018). Based on the results of the transformation calculation, the pseudogravity anomaly contour map obtained has values ranging from -115,938 – 124,286 mGal. The pseudogravity anomaly map looks simpler and more informative than the local magnetic anomaly map as shown in Figure 10. Based on this figure, the highest pseudogravity anomaly value is 124.29 mGal, which is located at 109.131225° E and 7.569342° S. This location is estimated to be the center of basaltic intrusion which is very compact in the form of a dyke structure, according to geological information (Asikin and Handoyo 1992). The high anomaly in the east area indicates that the intrusion of compact basaltic rocks is near the surface, whereas the low anomaly in the west area indicates the dominance of sedimentary rocks near the surface with low density.

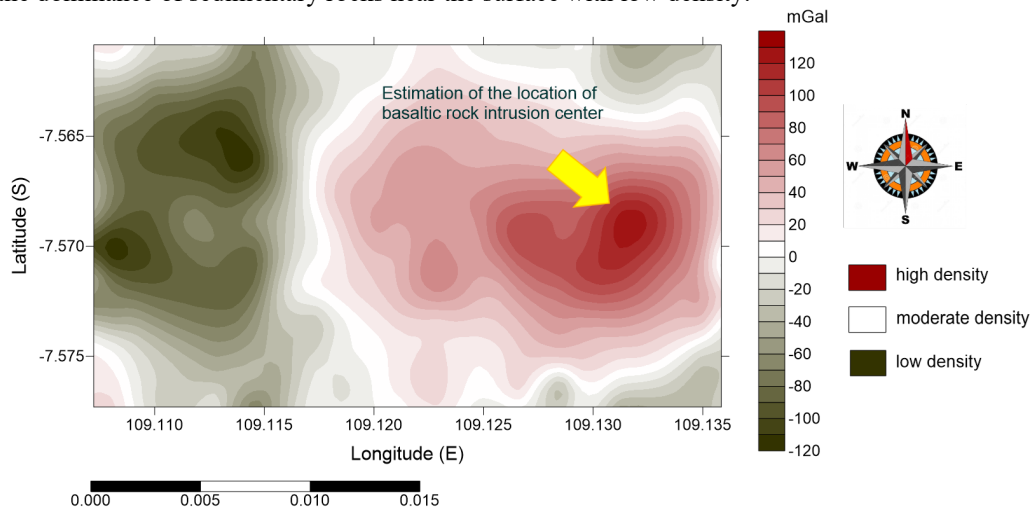


Figure 10 The pseudogravity anomaly contour map of the research area; the maximum value represents the location of basaltic rock intrusion center which is very compact (high density).

Although the pseudogravity anomaly contour map is relatively more informative in showing the subsurface anomaly sources location; but to clarify the lithological contact boundaries, so horizontal gradient calculations can be applied. The maximum horizontal gradient of pseudogravity anomalies data originating from subsurface objects or rocks tends to be at the edge of the object so that the maximum gradient will be localized directly at the edge of the object as shown in Figure 4 (Blakely 1995). This can be applied to identify the contact boundaries of the basaltic lithology to the surrounding rocks by observing the rock density which changes suddenly in a lateral direction (Nurdiyanto et.al. 2004). The horizontal gradient contour is shown in Figure 11 with values ranging from 0.003 – 0.553 mGal per m. These lithological contact boundaries represent the distribution pattern of the basaltic intrusion in the research area. In general, the distribution pattern of basaltic rocks is in accordance with the geological map as has been shown in **Figure 2**, although there are slight differences. This difference is understandable because the horizontal gradient map depicts the distribution pattern of basaltic intrusion on the surface and subsurface (Blakely 1995); meanwhile, the geological map only shows the distribution of basaltic rocks exposed on the surface. In addition to penetrating from below, this basaltic rock intrusion also breaks parallel to the surrounding sediment rock layers. Based on the appearance in the field, these rock units form a sill structure, which is an intrusion of igneous rock that is parallel to the plane of rock layers with an elongated flat shape (Sembiring et.al. 2016) as seen in Figure 12.

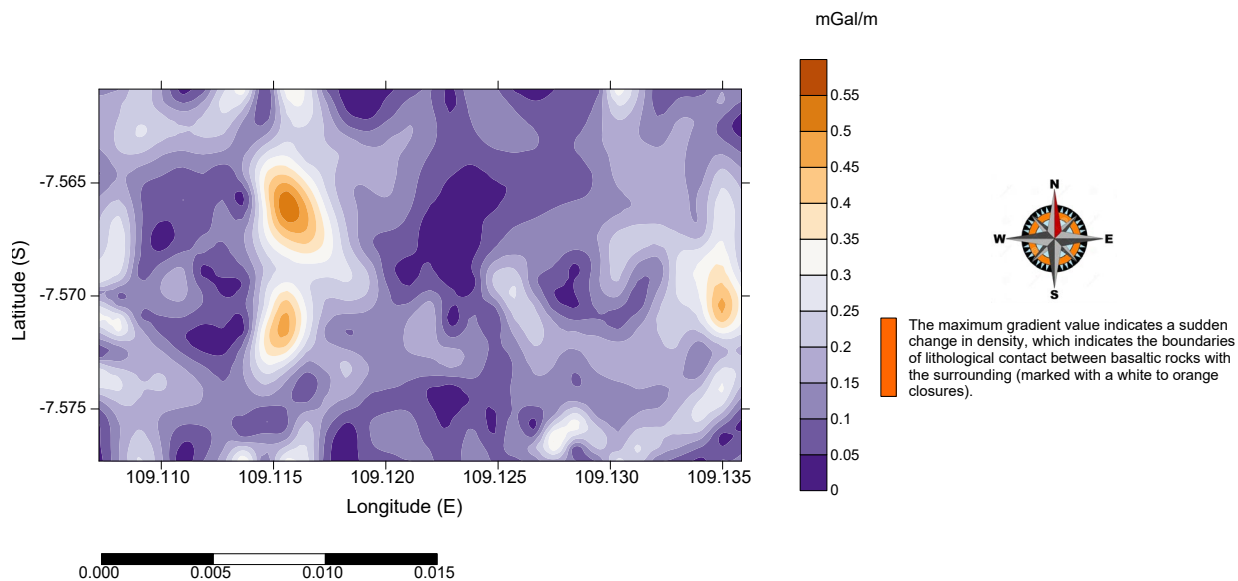


Figure 11 Horizontal gradient contour map showing the suitability of basaltic rock distribution with the geological map of the research area.



Figure 12 Photo of basaltic intrusion outcrop that parallels to the alternating area of sandstone and claystone at the research area.

## 6. Conclusion

The magnetic survey has been carried out in Karanglewas Village and the surrounding, District of Jatilawang, Regency of Banyumas, Central Java, Indonesia to identify the location of basaltic intrusion and its distribution patterns. The research area stretches on the position of  $109.107222^{\circ}$  –  $109.134944^{\circ}$  E and  $7.561361^{\circ}$  –  $7.577306^{\circ}$  S with an elevation ranging from 29.0 – 232.0 m. The total magnetic field strength data obtained in the field are in the range of 41.804.58 – 46.719.76 nT. After some corrections and reductions were applied, then the local magnetic anomalies data can be obtained with values ranging from -2,961.11 – 1,516.31 nT. The obtained local magnetic anomaly map still shows complicated closures, so making interpretation difficult. The pseudogravity transformation has been applied to reduce the complexity of the magnetic anomaly contour map and the difficulty of interpretation. The pseudogravity anomaly map acquired looks more informative with values ranging from -115.94 – 124.29 mGal. The highest value of the pseudogravity anomalies data is 124.29 mGal located at the positions of  $109.131225^{\circ}$  E and  $7.569342^{\circ}$  S; and interpreted as the location of a very compact basaltic rock intrusion. To clarify the lithological contact boundaries of the basaltic rock intrusion to the surrounding rocks and its distribution pattern, the calculation of the horizontal gradient has been applied to the pseudogravity anomalies data. The horizontal gradient contour

map acquired has values ranging from 0.003 – 0.553 mGal/m. The direction of spread of the basaltic intrusion has been shown on the horizontal gradient contour map and is in accordance with the geological map of the research area, which is oriented relatively from the east to the west.

## Acknowledgments

We would like to thank the Chancellor of Jenderal Soedirman University and the Chair of the Community Service Research Institute of UNSOED for receiving the research project and the funds provided. We would also like to thank the Dean of the Faculty of Mathematics and Natural Sciences and the Head of the Geophysics Laboratory of UNSOED for the Proton Precession Magnetometer (PPM) equipment provided. Apart from that, we also express our appreciation to the research team who have worked hard, particularly in data acquisition in the field.

## References

- Harsanto, A. A. P., *Geology and Subsurface Analysis of Natural Gas Seaking with Geoelectric Method in Karanglewas Village, Jatilawang District, Banyumas Regency, Central Java*, Thesis S-1, Faculty of Engineering, Jenderal Soedirman University, Purwokerto, 2013.
- Anonimus, Basalt: Definition-Spread-Benefits, Available: <https://ilmugeografi.com/geologi/batu-basalt>, May 20, 2020.
- Adagunodo, T. A., Sunmonu, L. A., and Adeniji, A. A., An Overview of Magnetic Method in Mineral Exploration, *Journal of Global Ecology and Environment*, vol. 3, no. 1, pp. 13-28, 2015.
- Lino, L. M., Cavallaro, F. A., Vlach, S. R. F., and Coelho, D. C., 2D Magnetometric Modeling of a Basic-Intermediate Intrusion Geometry: Geophysical and Geological Approaches Applied to The Limeira Intrusion, Paraná Magmatic Province (SP, Brazil), *Brazilian Journal of Geology*, vol. 48, no. 2, pp. 305-315, 2018.
- Cyprian, B. M., *Iron Ore Mineral Deposits Exploration by Ground Magnetism in Kindani Area, Meru County, Kenya*. Thesis Master of Science, Physics Department Jomo Kenyatta, University of Science and Technology, Kenya, 2012.
- Ansari and Alamdar, Reduction to the Pole of Magnetic Anomalies Using Analytic Signal, *World Applied Sciences Journal*, vol. 7, no. 4, pp. 405-409, 2009.
- Asikin, S., and Handoyo, A., *Geological Map of Banyumas Sheet, Java, Scale 1: 100.000*. Center for Geological Research and Development, Bandung, 1992.
- Telford, W. M., Gedaart, L. P., Sheriff, R. E., *Applied Geophysics*, Cambridge University Press, Cambridge, 1990.
- Sehah, Raharjo, S. A., and Risyad, A., A Geophysical Survey with Magnetic Method for Interpretation of Iron Ore Deposits in the Eastern Nusawungu Coastal, Cilacap Regency Central Java Indonesia, *Journal of Geoscience Engineering, Environment, and Technology (JGEET)*, vol. 5, no. 1, pp. 47-55, 2020.
- Chambodut, A., *Geomagnetic Field, IGRF – International Geomagnetic Reference Field*, Encyclopedia of Solid Earth Geophysics, Harsh Gupta (ed.), Springer, India, 2015.
- Yolanda, F., Ismail N., and Gunawati, Pseudogravity Transformation of Total Magnetic Field Anomaly Data in Bur Ni Geureudong, Bener Meriah, *Journal of Aceh Physics Society*, vol. 7, no. 3, pp. 110-113, 2018.
- Blakely, R.J., *Potential Theory in Gravity and Magnetic Applications*, Cambridge University Press, New York, USA, 1995.
- Pratt, D. A., and Shi, Z., An Improved Pseudo-Gravity Magnetic Transform Technique for Investigation of Deep Magnetic Source Rocks, *ASEG 17 Geophysical Conference and Exhibition*, Sydney, 2004.
- Kusumah, Y. I., Suryantini, Wibowo, H. H., Horizontal Derivative from Gravity Data as a Tool for Drilling Target Guide in Wayang Windu Geothermal Field, Indonesia, *Proceedings World Geothermal Congress*, Bali, Indonesia, April 25-29, 2010.
- Ilapadila, Herimei, B., and Maria, Analysis of Regional Anomaly on Magnetic Data Using the Upward Continuation Method, *The International Conference on Geoscience, IOP Conference Series: Earth and Environmental Science* 279, 2019.
- The University of Auckland, Geology Rock and Mineral; Basalt, Available: [https://flexiblelearning.auckland.ac.nz/rocks\\_minerals/rocks/basalt.html](https://flexiblelearning.auckland.ac.nz/rocks_minerals/rocks/basalt.html), November 17, 2019.
- Sehah, Raharjo, S. A., and Prabowo, U. N., Innovation of Using Pseudogravity Anomaly Map for Interpretation of Massive Andesite Rock Distribution Patterns in Candiwulan Village, Kutasari District, Purbalingga Regency and Its Surroundings, *Jurnal Teras Fisika*, vol. 3, no. 1, pp. 115-123, 2019.



- Limbong, K., Ismail, N., dan Gunawati, Qualitative Interpretation of Total Magnetic Field Anomaly Data Reduction Pole Transformation in Weh Island, *Journal of Aceh Physics Society*, vol.7, no. 2, pp. 72-77. 2018.
- Nurdiyanto, B. S., Wahyudi, Suyanto, I., Magnetic Data Analysis to Determine the Subsurface Structure of the Hot Water Manifestation Area on the North Slope of Ungaran Volcano, *Proceedings of the Indonesian Geophysicists Association*, 29th Annual Scientific Meeting, Yogyakarta, October 5-7, 2004.
- Quesnel, Y., Langlais, B., Sotin, C., Galdeano, A., 2008. Modelling and Inversion of Local Magnetic Anomalies. *Journal of Geophysics and Engineering*, vol. 5, 2008, pp. 387- 400.
- Sembiring, R.R., Sunarwan, B., Syaiful, M., Geology and Study of Turbidite Deposits in Ciwuni and Surrounding Areas, Kesugihan District, Cilacap Regency, Central Java, *Jurnal Online Mahasiswa (JOM) Geological Engineering Section*, vol. 1, no. 1, pp. 1-14, 2016.

## Biographies

**Sehah**, currently works as a lecturer in Department of Physics, Jenderal Soedirman University, and author of several articles related to physics, geophysics, and geology which are widely published in some journals such as Indonesian Journal of Applied Physics (IJAP), Journal of Geoscience, Engineering, Environment, and Technology (JGEET), Journal of Geology and Mineral Resources, Journal of Physics and Its Application, Journal of Physics Flux, Journal of Physics Research and Its Application, Bulletin of Scientific Contribution: Geology, IOP series, and others. The author is active in conducting geophysical research using magnetic and geoelectric methods, such as exploration of groundwater, iron sand, igneous rock and volcano, subsurface geological structures, and other natural resources. The author completed his undergraduate education (S.Si.) at the Physics Department, Diponegoro University, Semarang, Indonesia, then continued his Masters of Science (M.Si.) at the Geophysical concentration, Universitas Gadjah Mada, Yogyakarta, Indonesia.

**Urip Nurwijayanto Prabowo**, currently works as a lecturer in Department of Physics, Faculty of Mathematic and Natural Science Jenderal Soedirman University, and author of several journals related to physics, geophysics such as Jurnal ScienceTech, Jurnal Angkasa, International Journal of Science and Education (IJOSE), Jurnal teras Fisika and others. Research interest in geophysics. The author graduated from Physics Education Department of Universitas Negeri Semarang (UNNES), Indonesia, then continued his Masters of Science (M.Sc.) at the Geophysical concentration, Gadjah Mada University, Indonesia.

**Abdul Talib Bon** is a professor of Production and Operations Management in the Faculty of Technology Management and Business at the Universiti Tun Hussein Onn Malaysia since 1999. He has a PhD in Computer Science, which he obtained from the Universite de La Rochelle, France in the year 2008. His doctoral thesis was on topic Process Quality Improvement on Beltline Moulding Manufacturing. He studied Business Administration in the Universiti Kebangsaan Malaysia for which he was awarded the MBA in the year 1998. He's bachelor degree and diploma in Mechanical Engineering which his obtained from the Universiti Teknologi Malaysia. He received his postgraduate certificate in Mechatronics and Robotics from Carlisle, United Kingdom in 1997. He had published more 150 International Proceedings and International Journals and 8 books. He is a member of MSORSM, IIF, IEOM, IIE, INFORMS, TAM and MIM.



Ads by Google

[Stop seeing this ad](#)[Why this ad? ⓘ](#)

# Proceedings of the International Conference on Industrial Engineering and Operations Management

## COUNTRY

[United States](#)Universities and research  
institutions in United States

## SUBJECT AREA AND CATEGORY

[Business, Management and Accounting](#)[└ Strategy and Management](#)[Decision Sciences](#)[└ Management Science and Operations  
Research](#)[Engineering](#)[└ Control and Systems Engineering  
└ Industrial and Manufacturing Engineering](#)[Physics and Astronomy](#)[└ Instrumentation](#)[ⓘ ×](#)[Learn More Now](#)[Combustion](#)

## PUBLICATION TYPE

Conferences and Proceedings

## ISSN

21698767

## COVERAGE

-



Ads by Google

Stop seeing this ad

Why this ad

## SCOPE

Information not localized



Join the conversation about this journal

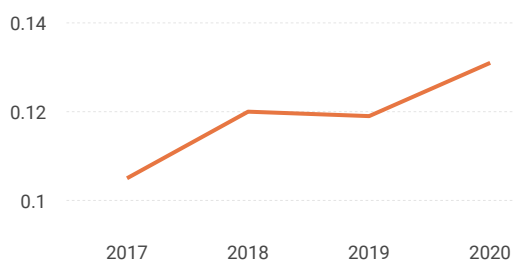


Ads by Google

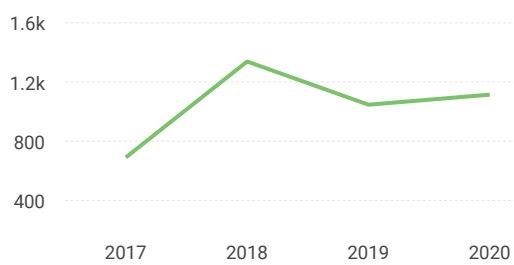
Stop seeing this ad

Why this ad? ⓘ

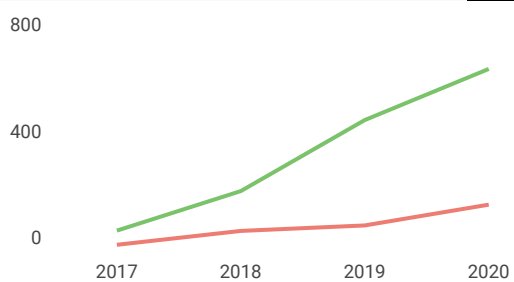
SJR



Total Documents



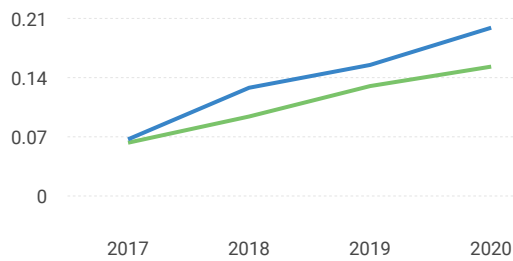
Total Cites Self-Cites



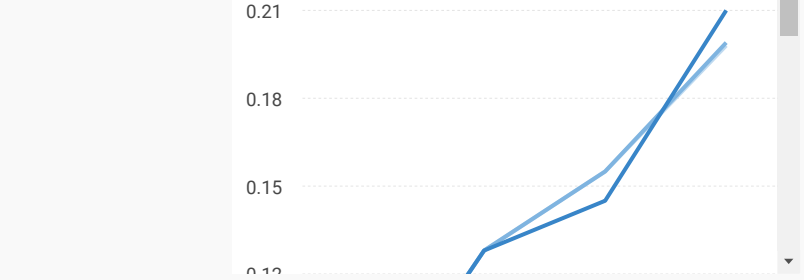
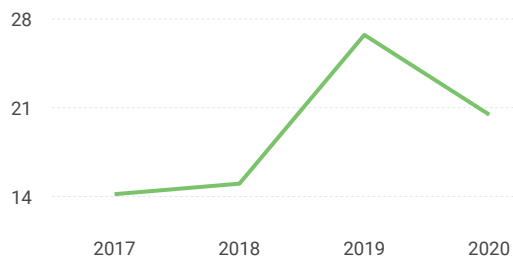
Citations per document

External Cites per Doc Cites per Doc

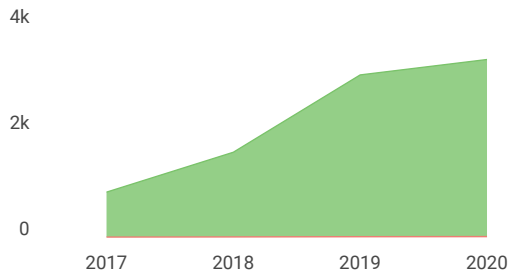




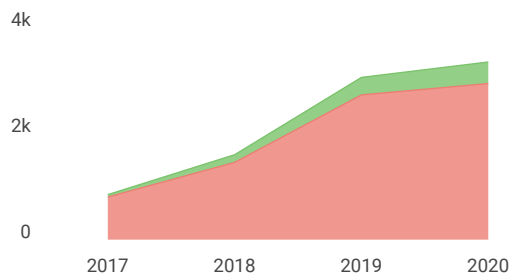
● % International Collaboration



● Citable documents ● Non-citable documents



● Cited documents ● Uncited documents



**Proceedings of the International Conference on...**

Not yet assigned quartile

**SJR 2021**  
0

powered by scimagojr.com

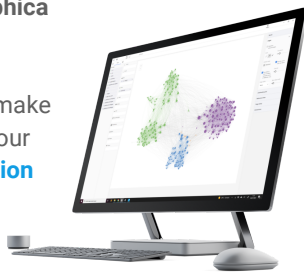
← Show this widget in your own website

Just copy the code below and paste within your html code:

```
<a href="https://www.scimaç
```

## SCImago Graphica

Explore, visually communicate and make sense of data with our **new data visualization tool**.



Ads by Google

Stop seeing this ad

Why this ad? ⓘ

Metrics based on Scopus® data as of April 2022



This author profile is generated by Scopus [Learn more](#)

# Sehah,

[Universitas Jenderal Soedirman, Purwokerto, Indonesia](#)

[Connect to ORCID](#) [Is this you? Connect to Mendeley account](#)

[Edit profile](#) [Set alert](#) [Potential author matches](#) [Export to SciVal](#)

## Metrics overview

3 Documents by author  
0 Citations by 0 documents  
0 *h*-index:

## Document & citation trends



## Most contributed Topics 2016–2020

**Aeromagnetic Survey; Magnetic Anomalies; Analytic Signal**

1 document

**Vertical Electrical Sounding; Geoelectrics; Groundwater Exploration**

1 document

[View all Topics](#)

3 Documents [Cited by](#) [0 Preprints](#) [10 Co-Authors](#) [Topics](#) [0 Awarded grants](#)

### Note:

Scopus Preview users can only view an author's last 10 documents, while most other features are disabled. Do you have access through your institution? Check your institution's access to view all documents and features.

[Export all](#) [Add all to list](#)

Sort by: [Date \(newest\)](#)

[View list in search results format](#)

[View references](#)

[Set document alert](#)

Conference Paper

**Estimate the location of basaltic intrusion in Karanglewas village Jatilawang district Banyumas regency central Java based on the pseudogravity anomaly map**

Sehah,, Bon, A.T., Prabowo, U.N.

*Proceedings of the International Conference on Industrial Engineering and Operations Management*, 2021, pp. 3240–3250

[Show abstract](#) [Related documents](#)

0  
Citations

Conference Paper • Open Access

**Estimation of Potential of Iron Sand in the Eastern Coastal Area of Cilacap Regency Based on the Local Magnetic Anomalies Data**

Sehah,, Kurniawan, M.A., Andriyanto, I., ...Raharjo, S.A., Sugito,

*Journal of Physics: Conference Series*, 2020, 1494(1), 012038

0  
Citations

Conference Paper

## Magnetic survey for qualitative interpretation of subsurface andesites rocks distribution in kutasari, purbalingga regency, indonesia

Sehah,, Raharjo, S.A., Prabowo, U.N., Sutanto, D.S., Bon, A.T.

*Proceedings of the International Conference on Industrial Engineering and Operations Management*, 2020, 59, pp. 2259–2268

Show abstract  Related documents

0  
Citations

[Back to top](#)

### About Scopus

[What is Scopus](#)  
[Content coverage](#)  
[Scopus blog](#)  
[Scopus API](#)  
[Privacy matters](#)



### Language

[日本語に切り替える](#)  
[切换到简体中文](#)  
[切换到繁體中文](#)  
[Русский язык](#)

### Customer Service

[Help](#)  
[Contact us](#)

ELSEVIER

[Terms and conditions](#)  [Privacy policy](#) 

Copyright © Elsevier B.V. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the use of cookies.

 RELX