



Industrial Metallurgy Research Group



Vision

To be a high profile research center in metallurgy through frontier research and innovation activities.

Mission

To establish research and consultation profile through outstanding researchers, product commercialization and high publicity through high impact publication.

- Industrial Metallurgy Research Group (IMReG) is formed to foster research on processing and characterization of metallic materials, emphasizing on application for biomedical implants and devices applications.
- Provides facilities and human resources toward making realities in research achievement for the faculty of mechanical engineering.
- The major activities of the Centre:
 1. **Materials Development**
 - Synthesis / formulation
 - Production
 - Characterization of properties.
 - Applications of materials.
 2. **Failure Analysis of materials** (**Metals**, polymers, ceramic, composites)
 3. Coordination and expansion of research activities within the university and industry.
 4. Education and training of young engineers and scientists.
 5. Services to industry through research and consultancy

IMReGers



Dr. Muhammad Husain Ismail (FKM, SA)
(Head)

Powder Metallurgy, Metal Injection Moulding, Porous Metallic & Ceramic, Shape Memory Alloy



Assoc. Prof Nor 'Aini Wahab (FKM, SA)

Powder Metallurgy, Heat treatment of Metals, Ceramics Processing, Composites, Materials Selection and Characterization of Materials



Dr. Siti Khadijah Alias (FKM, Pasir Gudang)

Metallurgy of Surface Coating by Pack Carburizing, World Class Manufacturing



Fauziah Md. Yusoff (FKM, SA)

Green Composite Materials, Metallurgy



Dr. Mohd Azman Yahaya (FKM, SA)

Impact Mechanics (Solid, Composite and Cellular Material) LS Dyna, Mechanical Design, High Strain Rate Testing Impact Energy Absorption



Ir. Dr. Bulan Abdullah (FKM, SA)

Advanced Metallurgy (Head), Advanced Manufacturing, Quality Management, Six Sigma



Ir. Dr. Salina Budin (FKM, Penang)

Biomechanics/Materials Engineering (Head), Composite Materials, Finite Element Method, Mechanics of Composite Materials & Reverse Engineering



Dr. Istikamah Subuki (FKK, SA)

Powder metallurgy, Metal Injection Moulding (MIM), Hap processing

IMReG ACHIEVEMENT(2015-2017)

PENCAPAIAN	2015	2016	2017
Master Degree – Enrolled/On-Going	5	8	12
Master Degree - Graduated	1	3	8
PhD – Enrolled/On-Going	1	8	8
PhD – Graduated	1	1	1
No. of research grants	2	7	10
Total value of research grants (RM)	151k	450k	850k
Total publication (Indexed Journals)	15	16	20
Total publication (Non-indexed Journals)	3	3	2
IPR (Patent, Industrial design, Copyright)	2	2	5

OTHER ACHIEVEMENT FMMI (2015-2017)

ACHIEVEMENT	2015	2016	2017
NO. OF CONSULTANCY/ INDUSTRIAL LINKAGE/ COLLABORATION (National & International)	2	4	4
NO. OF MEMBERSHIP OF PROFESSIONAL BODIES AND ASSOCIATIONS (National & International)	10 (IEM, BEM, MyTribos, etc.)	11	12
NO. OF SPECIAL INVITATION/ APPOINTMENT/ EXPERTISE (National & International) incl. Keynote Speaker, Invited speaker, Thesis examiner, Judge, Reviewer, Panel, etc.)	4	5	4
NO. OF AWARDS/ RECOGNITION AND APPRECIATION (National & International)	5	5	5

IP Rights

No	Title	Patent No
1	A Method of Producing Aluminium Foam with Central Pillar	PI 2014704013
2	A Method of Producing Dental Implant Article with Nickel Titanium Alloy	PI 2015700327
3	Method for Producing A Hydroxyapatite Scaffold	PI 2015703519
4	Dual Function of Palm Stearin in Processing of HAP Scaffold	UI 2014704093
5	A Method of Producing Aluminium Foam Tube for Heat Exchanger Application)	LY2016002487
6	Ti-Nb Beta Phase Titanium Alloy For Biomedical Implant	LY2016000600
7	Development of Biomedical Staple Using Metal Injection Molding (MIM)	LY2016000604
8	Copper/Carbon Nanotubes as Electrical Brushes In Electric	LY2016000599
9	Zirconia Ceramic Dental Screw Fabricated Via Powder Injection Moulding (PIM)	LY2016000603

	Research Title	Source	Company	Amount (RM)	Begin	End
1	Project Mentor : Porous Nickel Titanium Dental Implant	MOF : Cradle Investment Programme, CIP500	Nitium Technology Sdn. Bhd	150,000	Feb 2015	Feb 2017
2	Project Collaborator : Low Cost But High Quality Porous Nickel Titanium Dental Implant via Metal Injection Moulding	MOSTI : Inno Fund	Nitium Technology Sdn. Bhd	371,558	July 2017	July 2018

Materials Science Lab



Sample Prep



Optical Microscopes

Advanced Microscopy



Image Analyser



Atomic Force Microscope



Variable Pressure Scanning
Electron Microscope (VPSEM)

Characterization Room



Hardness Test



XRD



Density

Heat Treatment Lab

12 Furnaces

Muffle furnace

- 2 units (max temp 1600°C : ceramic)
- 2 units (max temp 1000°C, Heat Treatment)
- 1 unit Top loading (max 800°C, aluminium foam)
- 1 unit x gas
- 1 unit x Vacuum

Tube Furnace

- 1 unit Glass tube (1000°C)
- 2 unit Alumina tube

Jominy Quenching

- 2 unit (max temp ~1000°C)



Foundry



Die Casting (Max temp ~ 500 °C)



Arc Spectrometer



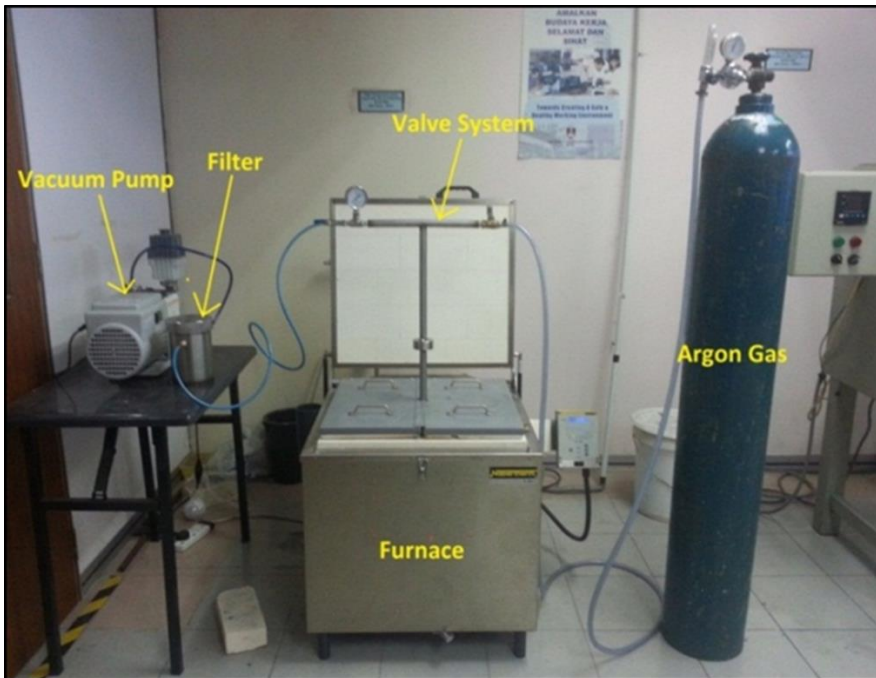
Tilting Furnace



Sand Blasting

Experimental Setup

Patent pending : A method of producing Aluminium Foam with Central Pillar (PI 20147074013)



Aluminium foam with central pillar: (a) Top view (a) Side view

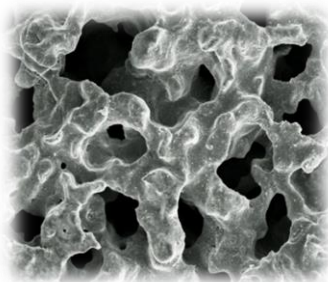
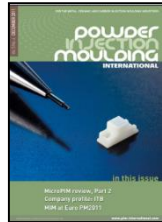
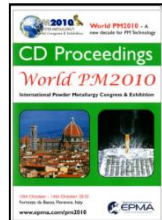
Aluminium foam with central hollow



*Centre for Advanced Materials Research, CAMAR
Faculty of Mechanical Engineering, UiTM*

The Journey of Porous NiTi alloy

- Awards & Recognition**
1. Gold PEIPTA 2017
 2. Gold ITEX 2017
 3. Special Award IENA, Germany 2017
 4. Gold IIDEX 2016
 5. Gold RISE 2015



FRGS (RM112k)
CRADLE (RM150k)

INNO FUND (RM370k)
PRGS (RM198k)
REI (RM32k)
GIP (RM20k)
SMARTFUND ???



2012

• PhD

- 2 ISI Q1 Journals
- 1 ISI Q3 Journal
- 1 Int. Magazine
- 3 Conference Papers
- 1 Book Chapter



2015

• Prototype Development



MySymbiosis
2014

PATENT PENDING (2015)
: PI 2015700327



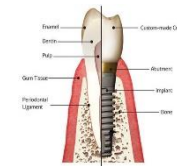
2017

The first prototype porous NiTi dental implant



2020

• Commercialization



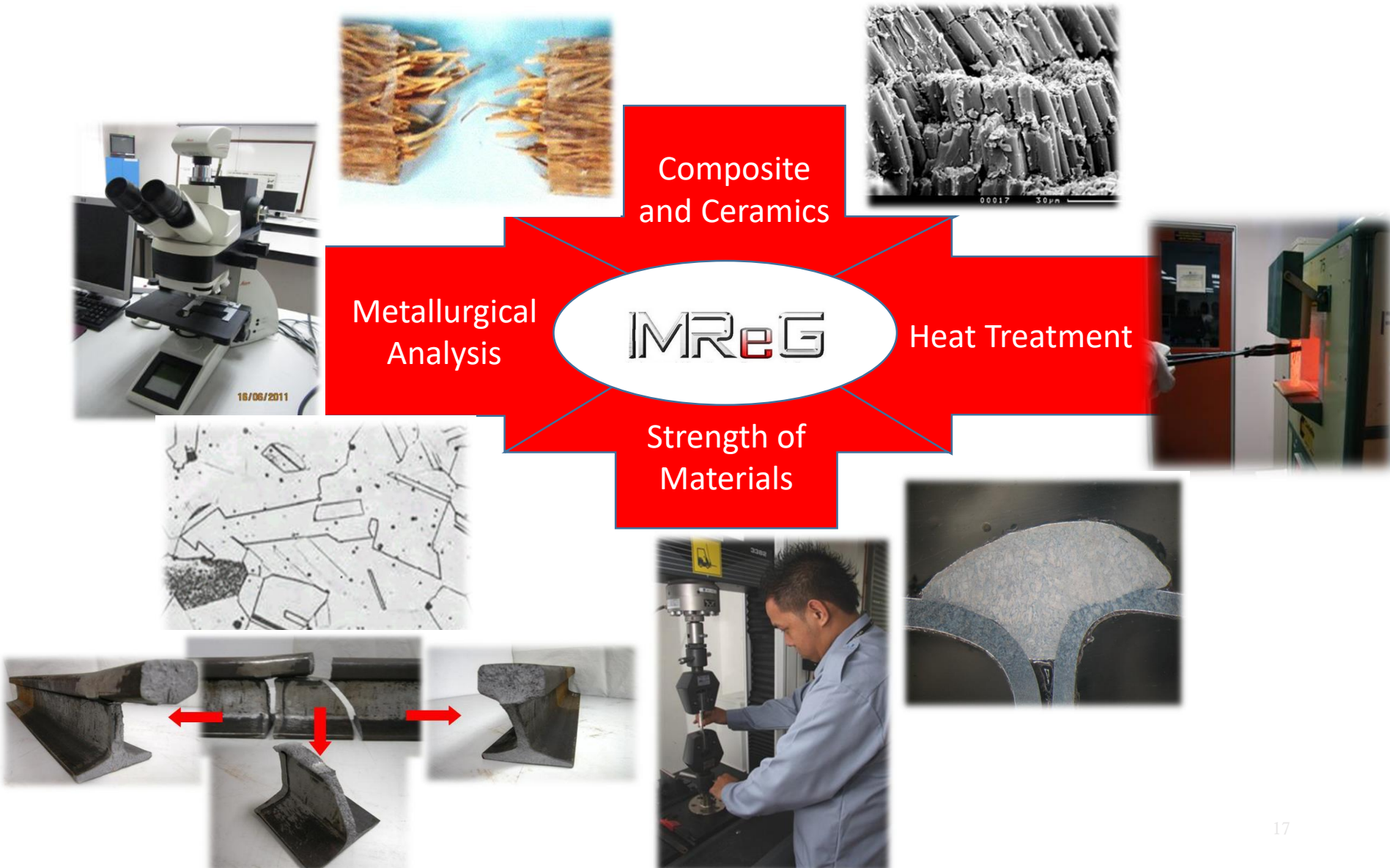
Faculty of Mechanical Engineering
Faculty of Dentistry



Industrial Partner :
Nitium Technology Sdn. Bhd



Niche Area2...Materials Characterization via Mechanical Testing





“**Industry and Academia are One, that's why we need to collaborate.**”

The Hon. Dato' Seri Idris Jusoh
Minister, Ministry of Higher Education Malaysia

COLLABORATE

IMReG with Industries



Aluminium cast components



Consultation project on defects casting component on 1st July 2014



Factory visit on 14th April 2017 for potential new project



Discussion on MSc and FYP projects on 2nd Nov 2017 (2 MSc and 6 FYP students)



Powder Metallurgy Sintered Components

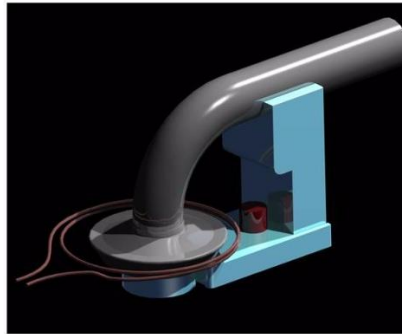


IMReG reaching out....11 March 2017

PPRN

1. Development of Induction Heating System Incorporated with Brass Ring (RM47k)

Leading Platform
Sdn. Bhd



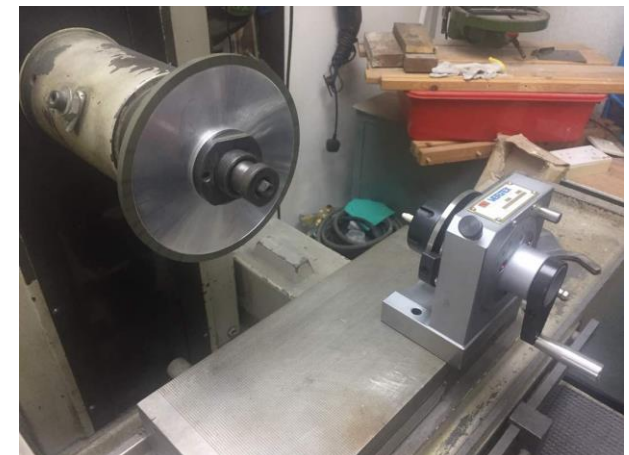
2. Solving the Problem of Machining of Alumina Guide Pin Sintered Components (RM50k)



Parts, Function and Assembly Design

Part no.	Part Name	Function
1	Punch Former	Clamp and rotate guide pin
2	Magnetic Base Plate	Assemble parts on it by magnetic force and mount the parts on the worktable.
3	Diamond Grinding Wheel	Remove excess diameter by grinding process
4	Dial Indicator	Indicator to check center alignment of guide pin
5	Carbide Wheel Dresser	Return the shape grinding wheel to original round shape and renew the grain for cutting purpose.
6	Dust Protector	Protect the user eye's from dust
7	Dust Vacuum	To remove waste from grinding process.

*based on weightage decision matrix, design concept 4 is being choose because it meet the requirement of PDS

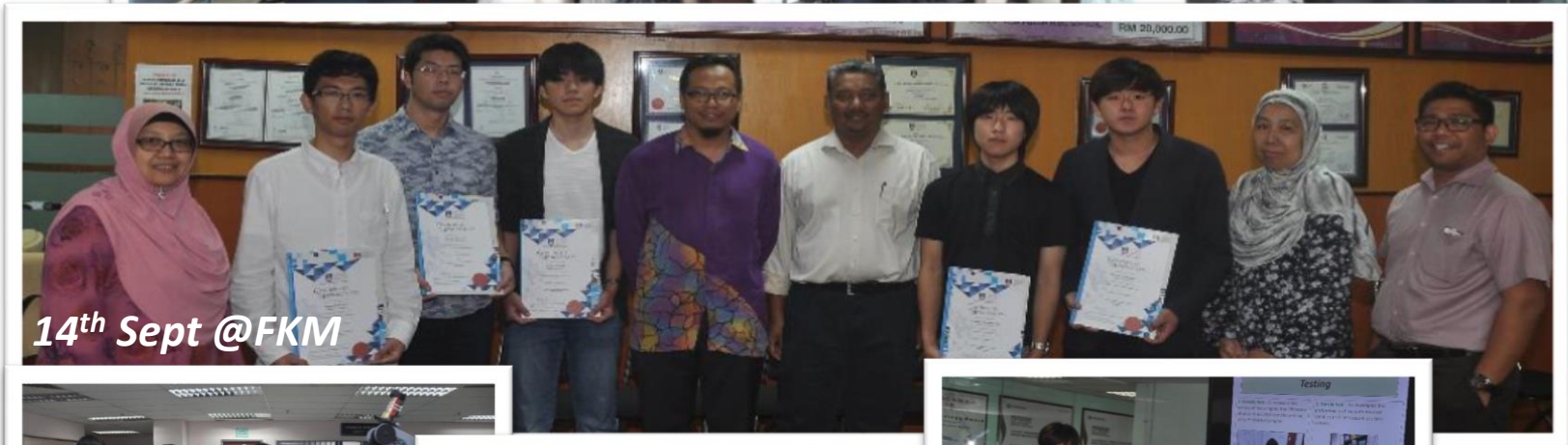


Students Attachment from National Institute of Technology, UBE College, Japan

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21st Aug @ OIA



14th Sept @FKM



Basic Foundry : Melting of Aluminium Cans



CSR activities

From Waste to Wealth



promoting
STEAM
Science Technology Engineering Art Math



*Demonstration session..
melting of aluminium cans*



melting and pouring

mini furnace

IMReG
Industrial Metallurgy Research Group



UiTM Malaysia
Student Chapter

**Institution of
MECHANICAL
ENGINEERS**



ALUMECHA



The product

Solidified aluminium

