



Examples of innovation in rail engineering education

Report



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Scheme:

Industry Academia Partnership Programme

Project title:

MetroExchange: Thai rail engineering education and research improvement by exchange of good practice in metro operations in Thailand and in the UK

Duration:

1st April 2018 – 31st March 2020 (24 months)

Funders:

Royal Academy of Engineering under the Newton Fund (UK)

Office for Higher Education Commission (Thailand)

Partners:

Mahidol University (MU; Thailand)

Newcastle University (NU; United Kingdom)

Bangkok Mass Transit System Public Company Limited (BTS; Thailand)

Nexus Tyne and Wear (Nexus; United Kingdom)

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Introduction

Thailand is currently experiencing a rail renaissance with many rail and metro projects at planning and development stages. In the very near future the Thai railway sector will need to match the expanding infrastructure with a recruitment of well-educated new workforce. However, presently there are very few opportunities for potential employees to receive training and education in the railway field in Thailand.

The report lists a number of examples of innovative approaches to teaching rail at a higher education level by bringing examples from Thailand (TH), the United Kingdom (UK) and beyond. The objective of the approach is to share good practice and encourage discussion about the level of rail education and training currently on offer and potential changes needed in order to serve the demand of future rail workforce development in Thailand.

The report is organised in 12 sections, each presenting details of one specific approach.

The work presented in the report is part of MetroExchange, a 2-year industry-academia partnership project co-funded by Newton Fund (UK) and OHEC (TH) which aims to improve rail engineering education and research in Thailand by focusing on exchange of good practice in assessment of metro operations in the UK and in Thailand.

Keywords

rail, education, training, innovation

Background

Each region in the world faces its own opportunities and challenges related to the railway sector. The two partner countries in MetroExchange project are currently at very different stages of development and maturity of their railway/metro systems.

In **Thailand** the railways are developing with:

- Rail renaissance across the country, interest in rail projects in various regions;
- Metro expansion in Bangkok, both skytrain (including monorail lines) and underground;
- Construction of double railroad tracks;
- High speed rail plans in collaboration with China and Japan;
- Rail policy reforms.

There are very few opportunities for rail education and training in Thailand:

- Vocational level:
 - Banphai Industrial and Community Education College
 - Surat Thani Technical College
 - Chonburi Technical College
 - Ayutthaya Technical College
 - Hatyai Technical College
 - Wapi Pathum Industrial and Community Education College
 - Ko Kha Industrial and Community Education College
- Undergraduate level:
 - Elective classes in rail (7 universities; mechanical, electrical, civil);
 - Engineering student project

- Postgraduate level
 - Kasetsart University – rail engineering (Master, focus on **mechanical**);
 - Mahidol University – rail engineering (Master, focus on **operations**);
 - NEW! Chulalongkorn University – The Sirindhorn International Thai-German Graduate School of Engineering (TGGS) - Railway Vehicles and Infrastructure Engineering (Master, focus on **civil / mechanical**)
- In the **UK** the railway industry faces other challengers related to:
 - Ageing workforce;
 - Ageing infrastructure;
 - Capacity issues/operational improvements.

Many colleges and universities offer railway programmes in collaboration with industry, e.g.:

- Vocational courses at Newcastle College Rail Academy;
- Master programmes and trainings at Birmingham Centre for Railway Research & Education (at Birmingham University);
- Master programme in Urban Railways (at University College London).

Example 1

Short courses delivered by external guests (TH)

Description

A series of short courses, usually between 2 and 5 days, with guest lectures and hands-on activities, are being delivered by experts from academia and industry at MU. These are often integrated into a Master programme curriculum, so that students are obliged to attend the classes. In addition, undergraduate and PhD students as well as staff and external guests (academics from other universities and rail professionals) are also welcome to join these courses. The courses are delivered in collaboration with international partners, often linked to ongoing research and education projects, and topics are agreed in advance and related to the expertise of guests.

Examples

- **“Metro operations performance and benchmarking”** – a 2-day course delivered by 2 x Nexus staff (Tyne and Wear Metro operator in the UK) at MU in November 2018
- **“Novel Approaches and Techniques in Rolling Stock Design”** – a 2-day course delivered by 1 x academics from Newcastle University at MU in November 2019
- **“Metro operations reliability and passenger crowd management”** – a 2-day course delivered by 2 x academics from University College London (UK) at MU in November 2018
- **“Telematics in rail and public transport”** – a 10-day course delivered by 1 x academic from University of Applied Science Wildau (Germany) at MU in January/February 2019

Benefits
(to staff and students)

- Access to external expertise;
- Exposure to new/different teaching and learning practices;
- Opportunity to practice English language skills.

A short course at MU



Novel Approaches and Techniques in Rolling Stock Design
Newcastle University at MU in November 2019



Metro operations performance and benchmarking by Nexus

Example 2

eTalks delivered by external experts (TH)

Description

A series of 2 x short 60 mins eTalks, online talks using Skype, to connect experts located in a different country with students based in a classroom at MU. Both eTalks included 2 parts: a 30 mins talk and a 30 mins Q&A session, where students engaged in a discussion with the guests. As both talks were delivered by native English speakers, students had an opportunity to practice their English and listen to people using different English accents. The eTalks were delivered as part of ‘Research Methodology for Railway Transportation’ module, part of a Master of Engineering Programme in Rail Transportation Systems.

Feedback received from students was very positive, they enjoyed the opportunity to ‘meet’ experts online and be able to ask them questions related to the topics of railways as well as future career advice.

Examples

- “ **Freight research projects some ideas and concepts**” – eTalk delivered by Mr Phil Mortimer (TruckTrain; UK) in October 2018 focused on various rail freight projects and concepts;
- “ **Research Methodology for Railway Transportation**” – eTalk delivered by Dr Janene Piip (JP Research & Consulting; Australia) in October 2018 and focused on qualitative research.

Benefits (to staff and students)

- Access to international pool of experts;
- Free/cheaper option as no travel/accommodation costs required;
- Opportunity to practice English language skills.

eTalks delivered via Skype by Dr Janene Piip



Example 3

VR and gaming (international)

Description

Virtual Environment (VR) and gaming are now being used in railway education and training. VR is being used by rail industry (manufacturers) to train their staff, but also to “test” new designs and products. There is a potential to use this technology in rail engineering education, but this route has not been explored much as yet.

Examples

- **“Network Rail – Level Crossings”** – an app promoting a public safety campaign. The use of VR “encourages younger people to connect mentally and emotionally with staying safe at level crossings and in turn, helps key safety messages be remembered more effectively by providing immersive, powerful experiences on mobile”¹.
- **VR in Bombardier** – the company supports Bombardier Digital Mockup and uses the VR technology which “enables colleagues in Development and Production, as well as at management levels, to make considerably more precise and quicker decisions in joint reviews in real time and in different locations around the globe”².

Benefits
(to staff and students)

- No physical travel/technical visits needed;
- In-classroom experience;
- Exposure to fun and engaging activities.

References

¹ Network Rail Level Crossing app: <https://apps.apple.com/us/app/network-rail-level-crossings/id1236730318>

² Bombardier (2016) Digital Technology: Shaped to Perfection. Available at <https://www.bombardier.com/en/media/newsList/details.BT-20160114-MOVE-Digital-Technology-Shaped-to-Perfection.bombardiercom.html> Accessed 25 September 2019

Additional reading

³ BBC (2018) Virtual reality 'to improve rail safety for children and workers'. Available at <https://www.bbc.com/news/uk-wales-44726069> Accessed 25 September 2019

⁴ Dando, L, Asghar, I, Egaji, O, Griffiths, M, Gilchrist, E (2018) Motion Rail: A Virtual Reality Level Crossing Training Application. Proceedings of the 32nd International BCS Human Computer Interaction Conference (HCI), Belfast, United Kingdom, July 04 - 06, 2018. Available at <https://www.scienceopen.com/document?vid=d9824184-ff4f-4c6d-8e11-f0379661ad72>

Accessed 25 September 2019



VR in Bombardier

Example 4

eLearning (international)

Description

eLearning includes courses delivered online using different eTools and platforms. These courses are usually (free and) designed as stand-alone extracurricular modules, but could be also delivered as an introduction to a topic, which could be studied in more detail by enrolling on a (paid) university course/degree. However, this form is not very popular as yet, with very few eLearning courses in rail found online.

Examples

- **“Railway Engineering: An Integral Approach”**¹ – a MOOC course designed and delivered by TU Delft (the Netherlands) and thought via edX online platform in October-November 2018.¹
- **“High Speed Rail Learning System”** – an online platform run by Michigan Technological University (US), which was set up with the aim of offering various online courses covering high speed rail topics.²

Benefits
(to staff and students)

- Online access anytime and from anywhere;
- Often free with a paid certificate option;
- Enhances formal education and training;
- International student groups available offering multicultural experience.

References

¹ EdX (2019) Railway Engineering: An Integral Approach. Online course available at <https://www.edx.org/course/railway-engineering-an-integral-approach2> Accessed 25 September 2019

² The High Speed Learning System (2019) Available at <https://rail-learning.mtu.edu/> Accessed 25 September 2019

eLearning course in rail ¹



edX Courses + Programs & Degrees + Schools & Partners edX for Business

Category: Engineering Courses

Railway Engineering: An Integral Approach

Discover the science and complexity of railway systems, including how their efficiency depends on the alignment of all their components.

TU Delft

12,778 already enrolled

Enroll
Starts Apr 27, 2020

I would like to receive email from TU Delft and learn about other offerings related to Railway Engineering: An Integral Approach.

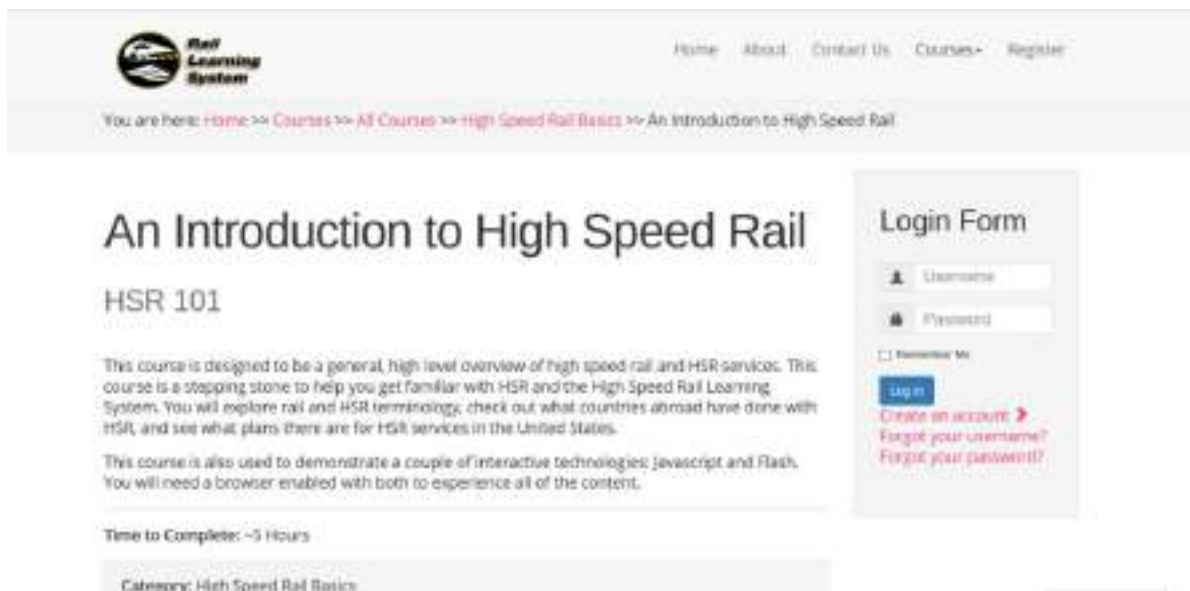
Play Video

About this course

Have you ever wondered what it takes to get your train on the right platform at the scheduled time every day?

Length	6 Weeks
Effort	3-6 hours per week
Price	FREE

“Railway Engineering: An Integral Approach” a MOOC course designed and delivered by TU Delft



High Speed Rail Learning System

Home About Contact Us Courses Register

You are here: Home >> Courses >> All Courses >> High Speed Rail Basics >> An Introduction to High Speed Rail

An Introduction to High Speed Rail

HSR 101

This course is designed to be a general, high level overview of high speed rail and HSR services. This course is a stepping stone to help you get familiar with HSR and the High Speed Rail Learning System. You will explore rail and HSR terminology, check out what countries abroad have done with HSR, and see what plans there are for HSR services in the United States.

This course is also used to demonstrate a couple of interactive technologies: javascript and Flash. You will need a browser enabled with both to experience all of the content.

Time to Complete: ~5 Hours

Category: High Speed Rail Basics

Login Form

Username

Password

Remember Me

Login

Create an account →
Forgot your username?
Forgot your password?

“High Speed Rail Learning System” – an online platform run by Michigan Technological University (US)

Example 5

Case Method Teaching (TH)

Description

A Case Method Teaching (CMT) employs a real-world situation (a case), with a problem or a dilemma, which is reviewed by students. When considering the case students become decision makers and, based on their knowledge, they are asked to study the problem and come up with a solution. This approach allows to apply gained knowledge into a real scenario and put theory into practice.

Students are usually expected to analyse and solve the case by considering theory, as well as to draw conclusions and come up with feasible solutions. They are encouraged to work in teams and discuss outcomes with a class, which allows to study alternative solutions and facilitates collaborative learning.¹

Examples

- **Case teaching on rail timetabling** – one rail case teaching was developed in 2020 at MU. It was based on a student research project at BTSC company. It was developed in the context of Bangkok metro extension. The case study was about the Gold-Line, the first automotive people mover (APM) system in Thailand.

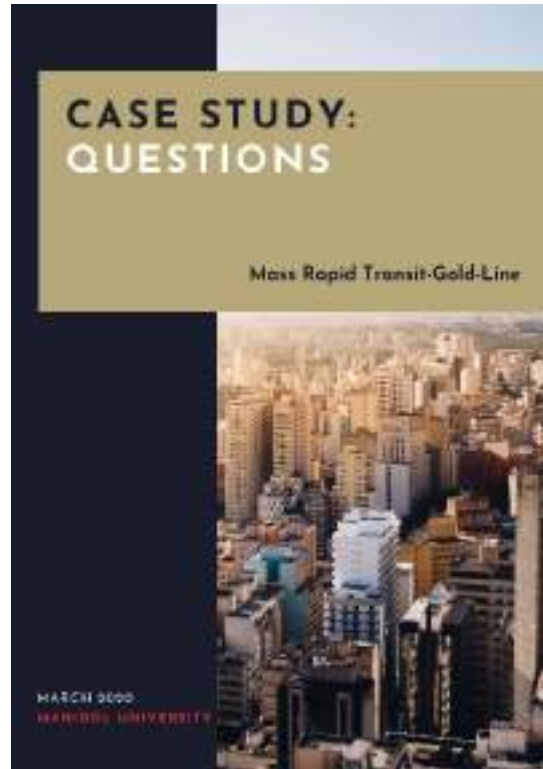
Benefits (to staff and students)

- Access to real-life scenarios;
- Opportunity to discuss alternative solutions with a group;
- Training of soft skills, including discussion and presentation skills.

References

¹ Stanford University (2019) Case Method Teaching. Available at <https://teachingcommons.stanford.edu/resources/learning/learning-activities/case-method-teaching> Accessed 25 September 2019

Example of a case method teaching material



Travelling mode A: Case study Metro Gold Line



Travelling mode B: Case study Metro Gold Line

Example 6

Student outreach (TH)

Description

Student outreach is a common method of engaging students with external world by giving them opportunities to volunteer or work with the general public or specific groups, using their hard and soft skills.

Examples

- **STEM rail activity challenge** – a student challenge delivered at MU in 2018. Undergraduate students attending a module titled “Introduction to railways” were challenged to design new hands-on activities addressed to the public based on their new knowledge gained during the course. Students formed 12 groups (max 4 students in each) and designed & delivered 12 different activities involving some aspects of Science, Technology, Engineering or Mathematics (STEM).
 - School visit (primary level, 7 groups);
 - Open House (pre-university level, 1 group);
 - On-campus event (university+ level, 4 groups).

Benefits
(to staff and
students)

- Opportunity to translate academic knowledge into non-academic language;
- Team work and soft skills improvement;
- Engagement with the public.

MU students delivering a STEM activity at a primary school in Bangkok.: Examples of resources developed by students:



Rail ballast



Salaya - Siam travel

Example 7

Rail summer schools (TH)

Description

A summer school is a short intensive course usually organised during a university break. It focuses on a specific topic and softs skills and allows students from different academic background and cultures to work together.

Examples

- **RailNewcastle summer school** – a series of 3 x summer schools delivered between 2012- 2014 at NU and co-funded by European Commission. Each edition lasted 3 weeks, which included: lectures in week 1, team work in week 2 and technical visits and group presentations in week 3. 50+ international staff and students attended each event. A number of student projects were published as scientific papers co-authored by both students and academics.
- **MetroExchange summer school** – a 5-day event delivered in June 2019 at NU and attended by students from MU and NU. The programme included talks delivered by academics from both universities and expert talks by invited guests from industry as well as technical visits to rail venues in the region.

Benefits
(to staff and
students)

- New knowledge in a railway area gained;
- International lecturers and students;
- Networking opportunities with academics and industry partners.

Rail summer schools



RailNewcastle summer school



MetroExchange summer school

Example 8

Rail academies (International)

Description

A rail academy is often a vocational school offering students education and training in railways, in a close partnership with a railway industry. These institutions are often supported by governments and in addition to a full-time vocational courses, offer apprenticeships programmes and bespoke training courses for industry.

Recently, a rail academy approach became popular in the UK, where various rail colleges were set up, but it is also available across the globe where railways are established and need a continuous supply of rail employees.

Examples

- **Newcastle College Rail Academy** – as part of Newcastle College the Academy offers rail courses at vocational level to students age 16+. They collaborate with local rail industry, who offers student placements, guest lectures, etc.

Link: <https://www.ncl-coll.ac.uk/railacademy>

- **DB Rail Academy** – the Academy run by Deutsche Bahn (DB) offers training and education for the rail sector with their flexible programme at vocational, professional, executive and academic levels.

Link: https://www.db-engineering-consulting.de/db-ec-en/consulting/db_rail_academy-1351126

Benefits (to staff and students)

- Vocational education and training offer;
- Often direct contact with industry;
- Opportunity to meet potential future employers.

Newcastle College Rail Academy facilities



Newcastle College Rail Academy



Newcastle College Rail Academy

Example 9

Rail apprenticeships (UK)

Description

An apprenticeship scheme is a popular option in the UK. It is a mix of on the job training (paid) and a classroom learning, and is supported by UK government and industry. The apprenticeships are addressed to students 16+ year old, but sometimes more mature students also join the scheme. They last between 1- and 4- years and usually are available in different disciplines, including¹:

- Business administration;
- Rail services (train drivers);
- Customer service;
- IT and telecoms;
- Engineering;
- Railway operations;
- Leadership and management.

Examples

- **Level 3 Engineering Apprenticeship offered by Network Rail²** – a 3-year scheme, where students aged 18+ study & work with Network Rail to receive rail qualifications.
Link: <https://www.networkrail.co.uk/careers/early-careers/apprenticeships/>
- **Transport for London Apprenticeships³** – the company offers three routes: business, engineering and technology and a recruitment process opens once a year. Students enrolled in the scheme spend 20% of their time working towards a professional qualification. In engineering itself the offer includes variety of options, e.g.:
 - London Underground Engineering (Level 3);
 - Railway Signalling Design Engineer (Level 3);
 - London Underground Engineering – Track (Level 3).Link: <https://careers.tfl.gov.uk/category/apprenticeships/>

Benefits
(to staff and
students)

- Opportunity to do 2-in-1: education and on-job training;
- Experience of working for the industry;
- A paid job.

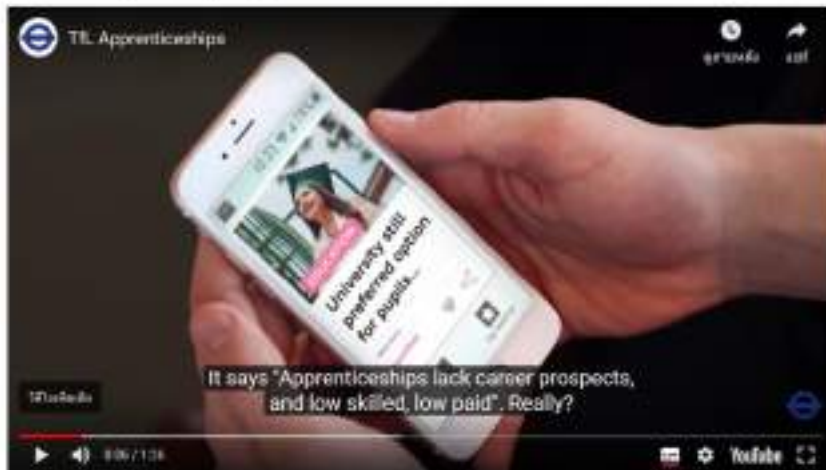
References

- ¹ Rail Delivery Group (2019) Apprenticeships. Available at <https://www.raildeliverygroup.com/about-us/careers/ways-into-rail/apprenticeships.html> Accessed 26 September 2019
- ² Network Rail (2019) <https://www.networkrail.co.uk/careers/early-careers/apprenticeships/> Accessed 26 September 2019
- ³ Transport for London (2019) Apprenticeships. Available at <https://careers.tfl.gov.uk/category/apprenticeships/> Accessed 26 September 2019

What is an apprenticeship?

Apprenticeships provide you with on the job training and responsibilities from day one. You'll spend 20% of your time working towards an industry recognised professional qualification, this may be one day a week or through a structured programme. The combination of work and learning allows you to develop your learning through practical experience.

We'll invest in your training and pay you at the same time.



Transport for London Apprenticeships³

<https://careers.tfl.gov.uk/category/apprenticeships/>

Example 10

Careers info (International)

Description

Rail careers are being promoted by the industry via online platforms where more details about specific job profiles can be found. Also, individual companies put case studies so that people interested in careers in the railway sector can understand the requirements for the job as well as how a day-to-day duties might look like.

Examples

- **Rail careers** – an Australian website, which includes information about different job categories available in the railways (including 8 different types of engineering, from civil and mechanical to environmental and software engineering), job vacancies, a list of employers (divided by regions), gender diversity stories and rail events.

Link: <https://railcareers.net.au/>

- **Railway Talents** – a network of rail professionals run by the International Union of Railways (IUC). Their website lists examples of career pathways in different parts of the railway sector and gives specific examples of professionals working in these fields.

Link: <https://railtalent.org/pathways/>

Benefits
(to staff and students)

- Showcase variety of rail jobs;
- Available online, so exposed to an international audience;
- A way to advertise employers.

Additional references

Rail Delivery Group (2019) Our people. Available at <https://www.raildeliverygroup.com/about-us/careers/our-people.html>
[Accessed 26 September 2019](#)

Office of Rail and Road (2019) Staff videos. Available at <https://orr.gov.uk/careers/our-people/staff-videos>
Accessed 26 September 2019

CP (2019) Careers. Available at <https://www.cpr.ca/en/careers> Accessed 26 September 2019



Rail careers

<https://railcareers.net.au/>

Example 11

STEM careers in transport cards (international)

Description

STEM stands for Science, Technology, Engineering and Mathematics, and these subjects are often used by rail engineers in their work. It is recognised, especially in Europe, that STEM shortages in the workforce are slowing down the economy and more people are encouraged to study them. Therefore, a number of initiatives around the world have been promoting STEM education and their relevance in the world of work, also by engaging with (rail) professionals who use STEM in their daily work. These cards can be useful at different educational levels, from primary school pupils to university graduates, as they are presented in a simple and informative format.

Examples

- **STEM in transport career cards** – MetroExchange project developed 8 x cards showcasing academia and industry partners from Thailand and the UK involved in the project and their level of STEM subjects used on the job. The aim of the exercise was to showcase variety of STEM engagement needed in variety of jobs as well as to explain what these jobs are really about.

Link: <https://www.slideshare.net/AnnaFraszczyk/metroexchange-stem-careers-in-transport>

Benefits
(to staff and
students)

- Showcase real rail academics and professionals involved in MetroExchange project;
- Available online for international distribution;
- A simple way to show a variety of people involved in rail and the level of STEM subjects used on-the-job.

MetroExchange STEM careers in transport cards



Dr Anna Fraszczyk

Gender | Female
Nationality | Polish
Languages | Polish, English
A-level subjects | Polish, English, Maths, Geography
Job title | Visiting Professor/Lecturer
Current employer | Mahidol University, Thailand

Sector:

- Industry
- Academia
- Policy/government
- Other



Mahidol University

STEM careers in transport

What is your job about?
 I am currently involved in rail education and research activities at university, which means that I work with students, but also do research individually and in a team.

What do you like about it?
 I like sharing my knowledge and experience in helping students reach their potential and evolve as researchers. I also like my research freedom which keeps me interested in other people's transport research and inspire me to develop new projects.

How do you apply STEM in your work?
 I often use a questionnaire as a tool to collect large amount of (transport) data and then run statistical analysis using MS Excel or SPSS software to understand the data better and come up with recommendations for stakeholders.

Which is your favourite STEM subject?
 I have always loved **math**, but I like to keep an eye on developments in transport **technology**, such as driverless trains, electric cars, MagS and hyperloop.

How do you see transport of the future?
 I think transport will have to be more sustainable so in cities there will be more attention to walking & cycling, Mass Rapid Transit (metro) and electric (driverless) vehicles. Beyond cities, rail, road, water and air transport will be embracing new technologies to ensure more effective and sustainable operations are enabled.

STEM scale at work

Level of STEM subjects used at work



Subject	Level
Science	Low
Technology	Medium
Engineering	Medium-High
Maths	High

MetroExchange

'STEM careers in transport' card series is developed by MetroExchange project team co-funded by Newton Fund (UK) + CHEC (TH).
 Last update: September 2018

Contact: Dr Anna Fraszczyk, Mahidol University, Thailand.
anna.fr@mahidol.ac.th



MetroExchange

STEM careers in transport

Dr Waiwan Wong

What is your job about?
 Teaching and supervising MEng students in their final year of research work.

What do you like about it?
 The challenge of teaching and supervising students in their final year of research work.

How do you apply STEM in your work?
 The teaching and research in engineering, science and technology.

What is your favourite STEM subject?
 Engineering and science.

How do you see the impact of the sector?
 The impact of the sector is to provide a high quality education and research in engineering, science and technology.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

STEM careers in transport

Dr Phuong Hoang

What is your job about?
 Researching and teaching in the field of engineering.

What do you like about it?
 The challenge of teaching and supervising students in their final year of research work.

How do you apply STEM in your work?
 The teaching and research in engineering, science and technology.

What is your favourite STEM subject?
 Engineering and science.

How do you see the impact of the sector?
 The impact of the sector is to provide a high quality education and research in engineering, science and technology.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

STEM careers in transport

Dr Mark Mansour

What is your job about?
 Researching and teaching in the field of engineering.

What do you like about it?
 The challenge of teaching and supervising students in their final year of research work.

How do you apply STEM in your work?
 The teaching and research in engineering, science and technology.

What is your favourite STEM subject?
 Engineering and science.

How do you see the impact of the sector?
 The impact of the sector is to provide a high quality education and research in engineering, science and technology.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

STEM careers in transport

Dr Huihui Peng

What is your job about?
 Researching and teaching in the field of engineering.

What do you like about it?
 The challenge of teaching and supervising students in their final year of research work.

How do you apply STEM in your work?
 The teaching and research in engineering, science and technology.

What is your favourite STEM subject?
 Engineering and science.

How do you see the impact of the sector?
 The impact of the sector is to provide a high quality education and research in engineering, science and technology.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

STEM careers in transport



Dr. Joohee Chung

Speaker Title: Professor
Language: Thai, English
Academic Degree: PhD
Skills: 10+ years of research experience in transportation systems, systems engineering, data analysis, system design

Where do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

What do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

What is your favourite STEM subject?
 I like systems engineering and data analysis.

What do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

STEM careers in transport



Dr. Anwarul Kabir

Speaker Title: Associate Professor
Language: English, Urdu, Bengali
Academic Degree: PhD
Skills: 10+ years of research experience in transportation systems, systems engineering, data analysis, system design

Where do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

What do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

What is your favourite STEM subject?
 I like systems engineering and data analysis.

What do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

STEM careers in transport



Mr. James Patterson

Speaker Title: Senior Lecturer
Language: English
Academic Degree: PhD
Skills: 10+ years of research experience in transportation systems, systems engineering, data analysis, system design

Where do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

What do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

What is your favourite STEM subject?
 I like systems engineering and data analysis.

What do you see the future of the industry?
 I see the industry moving towards more sustainable and intelligent systems.

STEM scale at work

Level of STEM subjects used at work



MetroExchange

Example 12

Railway challenge (UK)

Description

A Railway Challenge is a competition run by the Institution of Mechanical Engineers (IMECHE) in the UK and addressed to participants from the UK and beyond. They are challenges to design and deliver a mini train and then invited to test it during an event.

Duration: 10 months, kick-off in September, final in June/July;

Participants: open to university students, apprentices and graduates from across the world;

Description of the challenge¹:

“Participants are required to design and manufacture a miniature (10¼” gauge) railway locomotive in accordance with a set of strict rules and a detailed technical specification. The locomotives will be tested live at the competition weekend, which takes place in June at Stapleford Miniature Railway in Leicestershire, where several categories of winners and an overall Railway Challenge champion will be crowned”.

Benefits
(to staff and students)

- Team exercise helping to develop hard and soft skills;
- Exposure to other teams’ ideas and alternative engineering solutions;
- Networking opportunity with academics and industry at the showcase event.

References

¹ IMECHE (2019) Railway Challenge. Available at <https://www.imeche.org/events/challenges/railway-challenge/about-railway-challenge>

Accessed 26 September 2019

A Railway Challenge is a competition run by the Institution of Mechanical Engineers (IMECHE) in UK



Railway Challenge event in July 2019