



**Institute for Climate Change and
Sustainable Development**

Annual Report 2018-2020



**Collage of photos taken from the Active Travel Symposium organised at UM. Credits: Mr Carlos Cañas*

Introduction

The Institute for Climate Change and Sustainable Development was established in 2009. During 2018-2020 the Institute strengthened its research areas and continued with its research efforts to promote interdisciplinarity.

The Board of the Institute met regularly during this year where a number of key decisions were taken with respect to the work of the Institute and the development of programmes, projects and events.

This report outlines the work and achievements of the Institute for Climate Change and Sustainable Development during the period October 2018 and September 2020.

Aims of the Institute

- (a) to perform and promote interdisciplinary research on issues related to sustainable development, social sustainability, and climate change including mitigation and adaptation strategies;
- (b) to provide consultancy, advice and assistance on sustainable development and climate change including mitigation and adaptation strategies;
- (c) to provide continuous education, undergraduate, and postgraduate courses within the scope of the Institute subject to the Statutes and Regulations of the University;
- (d) to act as host institution for scholars, professors and chairs of international repute, as well as programmes, networks and fora, that aim to enhance the profile of the Institute within the regional and European research area, in areas related to sustainable development and climate change including mitigation and adaptation strategies;
- (e) to use telemetry, IT tools, intelligent systems, and modelling for monitoring, research, decision support and strategic planning;
- (f) to engage in knowledge transfer and awareness raising initiatives on sustainable development and climate change with companies, organisations and other institutions outside the University to promote best-practice (e.g. to promote the uptake of cleaner technologies; to mitigate and adapt to impacts of climate change on business operations and markets);
- (g) to network and liaise with similar or complementary, university institutions and centres for sustainable development or climate change; and
- (h) to disseminate acquired knowledge through online media, publications, seminars, conferences and teaching programmes.

THE BOARD OF THE INSTITUTE 2018-2020

Chairman **Prof. Simone Borg**
Vice-Chair and Director **Prof. Maria Attard**

Members:

Prof. Richard Muscat

Mr Philip Sammut

Dr Philip Von Brockdorff

Dr John C. Betts

Prof. Alex Torpiano

Prof. Sandro Lanfranco

Prof. Adrian Muscat

Prof. John A. Schembri

Dr Thérèse Bajada

Ms Margaret Camilleri Fenech

Dr Anton Bartolo

Ing. Anthony Rizzo (student)

Ms Yolande Newton (student)

The University of Malta Institute for Climate Change and Sustainable Development

The Administrative Office

During 2018-2020 the Institute was located in 45, Triq l-Esperanto, Msida and in Porta Cabins located in Car Park 6. The office housed the administrative as well as the academic staff, whilst the researchers, interns, students and project work was transferred to the Porta Cabins. The Director's Office was located in the Humanities. Although not ideal, work continued unabated throughout the years.

The Institute's Human Resources

Mr Carlos Cañas Sanz continued to work on a number of projects. He also continued his work on his MPhil at the Institute and presented his work at a number of conferences and a number of meetings locally and abroad.

Mr Stephen Joseph Giuliano worked as a Part-time Research Support Officer II to support the work of the H2020 CIVITAS DESTINATIONS Project

Ms Suzanne Maas and **Mr Mark Bugeja** continued working as Research Support Officers II to contribute to the H2020 CIVITAS DESTINATIONS Project. Both were also enrolled as full-time MPhil students. Ms Maas enrolled with the Institute carrying out research on bicycle sharing in island destinations and Mr Bugeja enrolled with the Faculty of ICT, working in AI and transport. During the period under review both successfully transferred to Ph.D.

Dr Thérèse Bajada, Lecturer continued servicing the Institute and several other departments within the University. She also became Associate Member of the Institute for Sustainable Energy at the University. **Ms Margaret Camilleri Fenech**, Assistant Lecturer (TR4) has continued to pursue their PhD studies, as well as supporting the growth in the Institute's teaching and administration.

Mr Raphael Mizzi has continued to work on the Green Travel.

Ms Romina Zammit, the Institute Administrative Assistant has continued to manage and support the Institute, its staff and activities.

Community Outreach

The Institute on the WWW

The Institute website has continued to act as a medium for communication with the University community and the general public. The Institute's website contains reference to almost all the work that the Institute engaged in since its opening in 2009. This is complemented by a Facebook page where news and other items are regularly uploaded

The Institute in the Media

Times of Malta – Business Section 16 October 2018 *Shared agile transport systems can reduce delay* Prof. Adrian Muscat, Prof. Maria Attard
<https://timesofmalta.com/articles/view/shared-agile-transport-systems-can-reduce-delay.691731>

THINK Magazine *Waste's Carbon Footprint* by Margaret Camilleri Fenech, December 2018
<https://www.um.edu.mt/think/wastes-carbon-footprint/>

Times of Malta 4 December 2018 *We are all pedestrians* Opinion piece by Suzanne Maas, Carlos Cañas, Maria Attard
<https://timesofmalta.com/articles/view/we-are-all-pedestrians-suzanne-maas-carlos-canas-sanz-and-maria-attard.695843>

Times of Malta 4 November 2018 *Mobility Research for Better Cities*. Article by Maria Attard
<https://timesofmalta.com/articles/view/mobility-research-for-better-cities.693436>

Isles of the Left article 28 November 2018: 'Malta's Transport Conundrum – Alternative Routes to Sustainable Mobility': <https://www.islesoftheleft.org/maltas-transport-conundrum-alternative-routes-to-sustainable-mobility> Also as a [podcast](#)

Malta Today on 28 December 2018: Malta's Transport Conundrum – Alternative Routes to Sustainable Mobility:
https://www.maltatoday.com.mt/news/national/91897/malta_public_transport_conundrum_alternative_routes_sustainable_mobility

Times of Malta on 4 December 2018: 'We are all pedestrians'
<https://timesofmalta.com/articles/view/we-are-all-pedestrians-suzanne-maas-carlos-canas-sanz-and-maria-attard.695843>

CIVITAS MOVE Newsletter 35 on 31 January 2019 Attitudes and perceptions towards bicycle sharing and cycling safety in Malta (published also on CIVITAS DESTINATIONS website on 7 December 2018 Suzanne Maas: <https://civitas.eu/news/attitudes-and-perceptions-towards-bicycle-sharing-and-cycling-safety-malta>

THINK Magazine *Food, Gender and Climate Change* by Precious Shola Mwamulima
https://www.um.edu.mt/iccsd-old/docs/Thinkmagazine_PSM.pdf

Times of Malta 24 March 2019 *A Climate for Change*. Interview with Prof. Maria Attard
<https://timesofmalta.com/articles/view/a-climate-for-change.705371>

MaltaToday 8 April 2019 *We are doing the opposite of what is needed* Interview with Prof. Maria Attard

https://www.maltatoday.com.mt/news/interview/94155/we-are-doing-the-opposite-of-what-is-needed_prof_maria_attard#.YFY3vy1Q3OS

Malta Business Weekly 16 May 2019 *E-Mobility in Malta. Challenges and Opportunities* Prof. Maria Attard

https://www.um.edu.mt/_data/assets/pdf_file/0006/394962/TMBWE-MobilityMAY19Attard_M.pdf

Times of Malta 7 July 2019 *Driven out by the wider roads.* Prof. Maria Attard

<https://timesofmalta.com/articles/view/driven-out-by-the-wider-roads-maria-attard.719926>

Times of Malta 5 August 2019 *'No price for parking': why cars have clogged Malta's roads.* Interview with Prof. Maria Attard.

<https://timesofmalta.com/articles/view/absence-of-a-policy-on-parking-populism-leading-to-congested-roads.726787>

The Accountant Summer 2019 *Sustainable Development. Why should we care?* Maria Attard

<https://www.miamalta.org/the-accountant/summer-2019/8234621>

The Malta Independent 21 September 2019: 'Micromobility: can we focus on opportunities instead of challenges?' Suzanne Maas: <https://www.independent.com.mt/articles/2019-09-21/newspaper-opinions/Micromobility-can-we-focus-on-opportunities-instead-of-challenges-6736213778>

THINK magazine on 25 September 2019: 'Sharing a love for cycling' Suzanne Maas:

https://issuu.com/thinkuni/docs/think_29_issuu
(page 8/9)



Times of Malta 8 November 2019 *Malta dead last in EU race to meet 2030 climate change targets*

Interview with Prof. Maria Attard

<https://timesofmalta.com/articles/view/malta-to-miss-2030-emissions-targets-by-a-long-shot.748410>

TVM News 19 February 2020 *Proġett biex iktar nies imorru bil-pass minn post għall-ieħor.* TVM News, Interview with Maria Attard

<https://www.tvm.com.mt/mt/news/progett-biex-iktar-nies-imorru-bil-pass-minn-post-għall-iehor/>

Times of Malta 19 February 2020 *New signs will tell you how long it takes to walk or cycle to University*. Carlos Cañas, Maria Attard, Suzanne Maas
<https://timesofmalta.com/articles/view/new-signs-will-tell-how-long-it-takes-to-walk-or-cycle-to-the.772085>

THINK Magaine 15 March 2020 *Walking Malta: #unsafe or #vibrant?* Carlos Cañas
https://www.um.edu.mt/think/walking-malta-unsafe-or-vibrant/?fbclid=IwAR24OkQau0lhSSVMYlfiN1yXTOFNVrfJ8o_AQnLKGUzVrgy3SZVapWw-KZw

Malta Independent 15 April 2020 *Active Travel Report urges safer and more accessible streets surrounding campus*.
<https://www.independent.com.mt/articles/2020-04-15/education/Active-Travel-Report-urges-safer-and-more-accessible-streets-surrounding-campus-6736222058>

Times of Malta 8 May 2020 *Transport, mobility and COVID-19*. Prof. Maria Attard
<https://timesofmalta.com/articles/view/transport-mobility-and-covid-19-maria-attard.790562>

TVM News 2 August 2020 *Għaliex il-Maltin iżommu lura milli jużaw il-karozzi tal-linja?* Dr Thérèse Bajada
<https://www.tvm.com.mt/mt/news/ara-għaliex-il-maltin-izommu-lura-milli-jużaw-il-karozzi-tal-linja/>

TV and Radio Contributions

During the year Prof. Maria Attard, Dr Thérèse Bajada and Ms Margaret Camilleri-Fenech contributed to a number of television and radio programmes to raise awareness and discuss issues related to sustainable mobility, climate change and sustainability and waste management. Programmes included TVAM (PBS), Newsbook (RTK Radio), Għandi X'Nghid (Radju Malta), NET Television, Super One Television and Campus FM.

Participation in conferences, invited lectures and other events

Symposium: Active Travel and Technology, ICCSD, University of Malta 30 October 2019

The ICCSD organized a symposium to showcase some of the research in active travel and conduct fieldwork with participants on walking and cycling around campus. A report was drawn up by Suzanne Maas, Carlos Cañas and Maria Attard about the need to upgrade the walking and cycling infrastructure around campus.

<https://www.um.edu.mt/newspoint/news/2020/04/active-travel-report-findings>

https://www.um.edu.mt/data/assets/pdf_file/0003/432363/ActiveTravelWorkshopReport-ICCSD.pdf

Social Entrepreneurship Summit, South Africa 2018

Shola Precious Mwamulima is a postgraduate student with the Institute for Climate Change and Sustainable Development following the M.Sc. Sustainable Development programme doing research on Comparative Food Consumption. She obtained a scholarship to attend the summit and present her research. Shola is a Mandela Washington Fellow, a flagship program launched in 2014 by Former American President Obama to invest in the future of Africa and in honour of Nelson Mandela.

<https://www.um.edu.mt/newspoint/news/features/2018/07/contributingtosocialentrepreneursipsummitinsouthafrica>



10th Edition of the Environment Awards for Industry 2020

Cleaner Technology Centre, 17th January 2020, Excelsior Hotel, Valletta

Prof. Maria Attard, Director of the Institute Chaired the Evaluation Committee together with Mr Anton Pizzuto from the Cleaner Technology Centre and Ms Margaret Camilleri Fenech who acted as member of the committee.



Prof. Maria Attard was awarded the following positions:

- Support for the participation in the Climate Change Study Tour funded and organised by the Foreign Office of the **German Federal Republic**. Funding awarded by the German Embassy in Malta. Berlin and Bonn, Germany, 13-19 October 2019
- Transport Research Chair 2020-2021 of the **Benelux Interuniversity Association of Transport Researchers (BIVEC-GIBET)**. This entails three keynote speeches during the upcoming year.

List of Conference Presentations:

Attard, M., Cañas, C., Maas, S., (2020) Determinants for walking and cycling to a university campus: insights from a participatory Active Travel workshop in Malta. 23rd Euro Working Group on Transportation (EWGT 2020) International Conference, Paphos, Cyprus (online), 16-18 September.

Maas, S., Paraskevas, N., Attard, M., Dimitriou, L. (2020) Understanding behaviour among bicycle sharing system users in Southern European island cities. 23rd Euro Working Group on Transportation (EWGT 2020) International Conference, Paphos, Cyprus (online), 16-18 September.

Attard, M., Maas, S., Cañas, C. (2020) A reality check on active travel. Assessing the difference between sustainable mobility policy and practice in Malta. RGS-IBG Annual International Conference, London, UK (online), 2-4 September.

Campbell, M., Attard, M. (2020) Understanding the neighbourhood in order to reduce car dependence. An exploratory study among residents in the islands of Malta. RGS-IBG Annual International Conference, London, UK (online), 1 September.

Bajada, T., Shaw, J. (2020) A theoretical model on information to influence decision-making for sustainable mobility. Presented at the RGS-IBG Annual International Conference (Online), London 1-4 September.

Bajada, T., Satariano, B. (2020) Questionnaire data about the impact of COVID-19 on mobility and wellbeing in Malta. Presented at the RGS-IBG Annual International Conference (Online), London 1-4 September.

Maas, S., Attard, M. (2020) Shared mobility services in Malta: user needs and attitudes. Transport Research Arena 2020, Helsinki, Finland. April 27-30, conference cancelled.

Chen, X., Wang S., Liu, Z., Attard, M. (2019) A Parallel Computing Approach to Solve Traffic Assignment Using Path-Based Gradient Projection Algorithm. Paper presented at 3rd International Symposium on Multimodal Transportation (ISMT2019). National University of Singapore, Singapore, 6-7 December.

Scerri, K., Attard, M. (2019) Streets, stress and society: the impacts of transport and the urban environment on the population's mental well-being. Proceedings of the SBE19 Malta International Conference Sustainability and Resilience held in Malta, 21-22 November.

Maas, S., Attard, M., Nikolauo, P. Dimitriou, L. (2019) Understanding shared bicycle use in Southern European island cities: insights from Limassol, Cyprus. Proceedings of the SBE19 Malta International Conference Sustainability and Resilience held in Malta, 21-22 November.

Bajada, T. (2019) Understanding the role of information and its influence on decision-making for sustainable mobility. A preliminary study. Proceedings of the SBE19 Malta International Conference Sustainability and Resilience held in Malta, 21-22 November.

Attard, M. (2019) Social inequalities in a car dominated built environment - the case study of Malta's transport system. Proceedings of the SBE19 Malta International Conference Sustainability and Resilience held in Malta, 21-22 November.

Rizzo, A., Attard, M. (2019) Climate Change Vulnerability Ranking of Coastal Roads in Malta using Multi-Criteria Methods. Proceedings of the SBE19 Malta International Conference Sustainability and Resilience held in Malta, 21-22 November.

Bugeja, M., Dingli, A., Attard, M., Seychell, D. (2019) A Framework for Queryable Video Analysis: A Case-Study on Transport Modelling. Paper presented at the SMAS'19, Los Cabos, Mexico, 21 October.

Bugeja, M., Dingli, A., Attard, M., Seychell, D. (2019) An Adaptive Transport Management Approach using Imitation Learning. Paper presented at the 3rd ACM Computer Science in Cars Symposium (CSCS2019), organised by the German Chapter of the ACM, Kaiserslautern, Germany, 8 October.

Leonardi, J., Maas, S., Attard, M. (2019) Developing the first Sustainable Urban Logistics Plan in Valletta, Malta. Paper presented at the WCTR SIG G3 Special Session at the AIIT 2nd International Congress TIS Roma 2019. Transport Infrastructure and Systems in a Changing World held in Rome, Italy, 23-24 September.

Maas, S., Attard, M. (2019) Attitudes and perceptions towards shared mobility services: Longitudinal results from a survey among the Maltese population. Paper presented at the WCTR SIG G3 Special Session at the AIIT 2nd International Congress TIS Roma 2019. Transport Infrastructure and Systems in a Changing World held in Rome, Italy, 23-24 September.

Dingli, A., Attard, M., Seychell, D., Bugeja, M. (2019) Comparison of Vehicle Detection Techniques applied to IP Camera Video Feeds for use in Transport Modelling and Planning. Paper presented at the WCTR SIG G3 Special Session at the AIIT 2nd International Congress TIS Roma 2019. Transport Infrastructure and Systems in a Changing World held in Rome, Italy, 23-24 September.

Attard, M. (2019) Mobility justice in urban transport. Proceedings of the AIIT 2nd International Congress TIS Roma 2019. Transport Infrastructure and Systems in a Changing World held in Rome, Italy, 23-24 September 2019.

Cañas, C., Attard, M., Haklay, M. (2019) A citizen science approach to assess the perceived walkable environment using elements of the pedestrian experience. Proceedings of the XXIV International Conference "Living and Walking Cities". Pedestrians, Urban Space and Health, Brescia, Italy 12-13 September.

Bajada, T.(2019) A discourse analytical methodology for examining tourists' opinions about a reformed bus service. Presented at the RGS-IBG Annual International Conference, London 27-30 August.

Cañas, C., Attard, M., Haklay, M. (2019) Developing a citizen science approach to assess the perceived walkable environment around a university campus. Presented at the RGS-IBG Annual International Conference, London 27-30 August.

Maas, S., Attard, M. (2019) Understanding shared bicycle use in a multiple-case study of Southern European island cities. Presented at the RGS-IBG Annual International Conference, London 27-30 August.

Camilleri, R., Attard, M., Hickman, R. (2019) Sustainable mobility and climate change mitigation – a framework for developing low-carbon land transport policies. Presented at the RGS-IBG Annual International Conference, London 27-30 August.

Attard, M. (2019) The inequalities of a car-based transport system in Malta. Presented at the NECTAR XV International Conference Towards Human Scale Cities – Open and Happy held in Helsinki, Finland, 5-6 June.

Maas, S., Attard, M. (2019) Attitudes and perceptions towards the introduction of shared mobility services in Malta. Paper presented at the 15th World Conference on Transport Research held in Mumbai, India, 26-31 May.

Papantoniou, P., Yannis, G., Vlahogianni, E., Attard, M., Regattieri, A., Piana, F., Pilati, F. (2019) Developing a Sustainable Mobility Action Plan for University Campuses. Paper presented at the 15th World Conference on Transport Research held in Mumbai, India, 26-31 May.

Attard, M., Muscat, A., Camilleri, M. (2019) The technology behind a shared demand responsive transport system for a university campus. Paper presented at the 15th World Conference on Transport Research held in Mumbai, India, 26-31 May.

Attard, M. (2019) Sustainable Tourism Travel in Small Island Destinations. The Case of Malta. Proceedings of the Transportation Research Board 98th Annual Conference held in Washington, D.C., USA, 13-17 January.

The Institute Visiting Lecturers



Susan Grant-Muller, Professor of Technologies and Informatics, Institute for Transport Studies (ITS), University of Leeds, UK
<https://www.its.leeds.ac.uk/people/s.grant-muller>

2018



Yusak Susilo, Professor of Transport Science at the KTH Royal Institute of Technology, Stockholm, Sweden
<https://www.kth.se/profile/yusak?l=en>

2019



Bhargab Maitra, Professor of Civil Engineering, School of Infrastructure Design and Management, Indian Institute of Technology Kharagpur, India

2019

New Research Activity

The Institute has continued to work on the projects awarded in the previous years. It has also succeeded to submit and participate in project proposals, both locally and abroad. Table 1 shows the projects and the outcome of the funding applications for 2018-2020.

Funding Programme	Title of Project	Project Partners	Outcome and Value
HORIZON2020	CIVITAS DESTINATIONS	Prof. Maria Attard, ICCSD and 27 other partners	AWARDED 2016
Interreg MED	SYNERGI-CAMP	Prof. Maria Attard, ICCSD follow up to CAMP-SUMP Project	NOT AWARDED
Interreg MED	Seaplanes MED	Prof. Maria Attard and a number of partners from European-Mediterranean Universities	NOT AWARDED
SINO-MALTA (MCST)	ACT	Prof. Maria Attard, Prof. Shuaian Wang (Hong Kong University)	NOT AWARDED
MCST IPAS+	CYPROMED 2019	Prof. Maria Attard, Suzanne Maas, ICCSD in collaboration with the University of Cyprus, Prof. Loukas Dimitriou	NOT AWARDED
MSCA	GO.STEM	Dr Anna Fraszczyk applying for Marie Curie Fellowship under the supervision of Prof. Maria Attard	NOT AWARDED
COST	MAAS – Mobility as a Service	Led by Universidad Complutense Madrid - Prof. Maria Attard	NOT AWARDED
COST	CA17132 European Network for Argumentation and Public Policy	Dr Thérèse Bajada – Management Committee Member	AWARDED
COST	CA18214 The Geography of New Working Spaces and the Impact on the Periphery.	Dr Thérèse Bajada – Management Committee Member	
SWAFS Programme	SLEEC	Led by University College London, UK - Prof. Maria Attard	NOT AWARDED
HORIZON 2020	EPITRANS	Led by Norwegian Centre for Transport Research with several other partners including ICCSD – Prof. Maria Attard	NOT AWARDED
SINO-MALTA (MCST)	PACTS	Prof. Maria Attard, ICCSD and Prof. Shuaian Wang (Hong Kong University)	NOT AWARDED
MCST IPAS+	CYPROMED 2020	Prof. Maria Attard, Suzanne Maas, ICCSD in collaboration with the University of Cyprus, Prof. Loukas Dimitriou	NOT AWARDED
Association of Commonwealth Universities	Visiting Grants for Academics	Prof. Maria Attard to visit Prof. Steven Farber, University of Toronto, Canada	NOT AWARDED

Travelling Smart – The Green Travel Plan Committee at the University of Malta



Prof. Maria Attard continues to chair the Green Travel Plan (GTP) Committee which aims to implement the University Green Travel Plan approved in 2012. Mr Raphael Mizzi, the GTP Coordinator administrates the GTP work as well as act as secretary to the GTP Committee.

The GTP Committee for 2018 – 2020 was made up of:

Prof. Maria Attard (Chair)
Ms Thérèse Bajada (Travel Plan Expert, ICCSD)
Mr Luke Abela/William Farrugia (President, KSU)
Mr Clayton Xuereb (Precincts Office)
Mr Joseph Camilleri (Precincts Officer)
Ms Amanda Ciantar (Office of Human Resources)
Ms Nathalie Cauchi (UHM)
Mr Raphael Mizzi (Secretary)
Ms Maronia Schembri (Precincts Office)
Prof. Luciano Mulé Stagno (UMASA)
Perit Christopher Spiteri (Director Estate & Works)

During 2018/2020 a number of initiatives were undertaken by the GTP Committee and the GTP Coordinator in order to improve travel to the University.

The Website

In order to maintain communication lines open with the University community the GTP website is updated on a regular basis with useful information and links about green travel to and from University.

Further useful links and information is made available through this website and publicised from time to time internally within the University community.

<http://www.um.edu.mt/greentravel>

Facebook

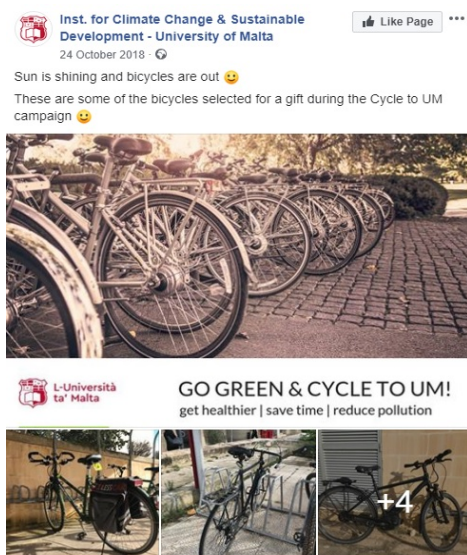
Since 2015 the ICCSD created a Facebook page where all the news and events related to the Institute are posted on this page. The GTP coordinator uploads several weekly news to create awareness about green travel with UoM members and other visitors.

Freshers' Week 2018

As part of the Freshers' Week promotion in the first week of **October 2018**, the GTP Coordinator distributed re-usable bottles to staff and students to encourage walking and to reduce waste. While distributing the bottles the GTP Coordinator handed out leaflets and gave information to individuals on how one can mix modes of transport in a typical week.

Cycle to UM Campaign

For the week of **22nd October 2018** the GTP Coordinator organised a cycling campaign for a week entitled '*Cycle to UM Campaign*'. UM members were encouraged to cycle to UM and to park their bicycles in the provided bicycle racks within UM Campus. Everyday different bicycles were randomly selected for a gift by the GTP Coordinator. The gifts which consisted of high visibility vests to be worn during cycling and bicycle lights were presented by the GTP Coordinator to the winners.



Breakfast for Cyclists

On the **19th December 2018** UM members who commuted to University by bicycle were offered breakfast on UM Quadrangle. The sum of €36.40 was collected by the participants and went towards *Christmas on Campus* in aid of Id-Dar tal-Providenza and I-Istrina.



L-Università ta' Malta
BREAKFAST FOR CYCLISTS
cycle to UM | have breakfast | share your experience
19 December 8-10am @ Quad

More Bicycle Racks on Campus (Sheffield Type)

On the 7th January 2019 more bicycle racks have been installed at University of Malta Campus as part of KSU effort to promote alternative mobility as part of a collective effort between Green Travel Plan committee members. The new addition consisted of 'Sheffield Type' bicycle racks which allows the bicycle to be secured in a variety of ways.



UoM Mobility Week - Sustainable transport information stand: March 21, 2019

As part of the University of Malta Mobility Week organised by KSU, the Institute for Climate Change and Sustainable development was present on campus as part of its community outreach objectives. ICCSD researchers Suzanne Maas, Carlos Cañas and Stephen Joseph Giuliano manned a stand alongside local transport service providers such as Nextbike, GoTo, Tallinja Bike and IoScoot among others in order to further the conversation on sustainable mobility options at UoM.



Multi-Modal and Active Travel to University Campaign

In April 2018 a new campaign *Multi-Modal and Active Travel to University* was launched. During this campaign a series of posters featuring members of staff were attached to notice boards and shared on UM social media, mainly Facebook and Instagram. The content of the posters highlighted the different modes of transport UM staff uses in a typical week to commute to/from UM. Most of the participants were selected from the GTP Survey 2018 results.



Maria Attard is an Academic. She commutes to University with her e-bike whenever possible and uses the car only when family commitments require her to drive. Cycling cuts down her travel time to 11 minutes from Lija.



Simon Bajada is a Senior Administrator. He walks everyday from San Gwann to University and it takes him just 12 minutes door to door!



Suzanne Maas is a Research Support Officer. She commutes from Senglea to University by taking the ferry to Valletta and cycling to University.

Installation of Repair Stand on Campus

On 9th May 2019 the GTP Committee installed the very first public bicycle repair stand in Malta on UM Msida Campus Quadrangle. The stand is simple to use and compatible with all types and models of bicycles. It includes service tools and a tyre pump and gauge. This will assist UM cyclists with simple repairs they might need while commuting to/from University by bicycle. This installation was funded by the Institute for Climate Change and Sustainable Development.



Breakfast for Active Travellers

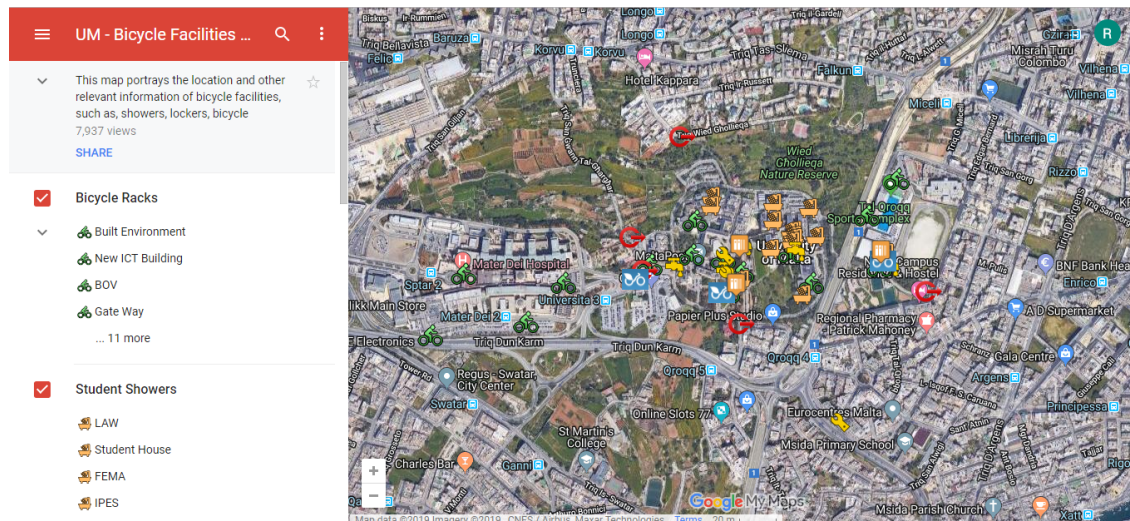
On the 23rd May 2019 another breakfast event was organised by the GTP Coordinator. This time it was dedicated for active travellers who come on foot, by bicycle or by bus. A good number of experiences and discussions were shared between different types of travellers.

A screenshot of a Facebook event page. At the top, there are three circular icons: a bicycle, a person walking, and a bus. The event title is 'Breakfast for Active Travellers' on May 23, 2019, from 08:00-10:00. It is hosted by the Institute for Climate Change & Sustainable Development at the University of Malta. The location is the Quadrangle at the University of Malta, Msida. There are several photos showing people gathered around a table with food and drinks, engaged in conversation. The event is public and has a 'Going' button.

UM Bicycle Facility Map Update

During June the GTP Coordinator updated the *UM Bicycle Facility Map* which contains seven different layers; Bicycle Racks, Student Showers, Staff Showers, Water Dispensers, Entry/Exit Paths, Bicycle Services and Lockers.

The map which is constructed with Google Maps had almost 8,000 views.



Green Travel Plan Website Update

During **August** the website interface had to be transferred to a new system and therefore the GTP Coordinator re-constructed new pages for the GTP website. The old Custom Travel Information section was no longer possible to be kept and therefore it was replaced by a new page entitled *'Getting to UM'*. This page consists various options on how one can arrive to Msida campus, on foot, by bicycle, by bus and by car. UM Members were notified of this new page through a notification sent by Communications office. The new URL of this page is: <https://www.um.edu.mt/gettingtoun>

Getting to UM Leaflets for the Freshers' Pack

During the last GTP meeting in **September 2019** the KSU President has offered the possibility to the GTP Coordinator to insert an information leaflet in the Freshers' Pack which is prepared to first year students. A copy of the leaflet below indicates the new part of the GTP website, with the aim of encouraging new students to try alternative options when they start their very first travelling to University.



Freshers' Week 2019

As part of the Freshers' Week promotion in the first week of **October 2019**, the GTP Coordinator together with other researchers from the Institute was present on campus with

information about active mobility. Visitors on stand had the opportunity to learn about our ongoing projects at the Institute, test ride an electric bicycle and play games by challenging our walking times from localities surrounding UM.



Would you like to try and e-bike? Magri Cycles will be present tomorrow from 1-3pm at University of Malta CP4 to offer you this experience!



Come challenge our walking times from localities surrounding University of Malta 😊 See you at Freshers' Week!

Please visit our new sustainable transport information page on <https://www.um.edu.mt/gettingtoun>



tallinja electric bicycles installed on Msida Campus.

The first station with tallinja electric bicycles was installed on Msida Campus in **October 2019**. Other stations are found in Valletta and nearby surroundings. Users can register using their tallinja card. This was deemed as an important step top the GTP as it will connect it to other sustainable modes of transport which already exist on Campus. This station was installed by the insistence from members within the GTP committee.



Published by lccsd Malta [?] · 1 November 2019 · 🌐

A station with tallinja bicycles was recently installed in Vjal Tessie Camilleri, UM Msida Campus.

The electric bicycles provide assistance while pedaling uphill or against strong winds. Bicycle sharing is an alternative mode of transport which allows individuals to rent a bike from a docking station and return it to any other docking station belonging to the same system. Other stations are found in Valletta and nearby surroundings. Users can register using their tallinja car... [See more](#)



Go Green and Cycle to UM Campaign

For the week of **11 November 2019** the GTP Coordinator organised a cycling campaign for a week entitled '*Go Green & Cycle to UM Campaign*'. UM members were encouraged to cycle to UM and to park their bicycles in the provided bicycle racks within UM Campus. Everyday different bicycles were randomly selected for a gift by the GTP Coordinator. The gifts which consisted of high visibility vests to be worn during cycling and bicycle lights were presented by the GTP Coordinator to the winners.

UM Inst. for Climate Change & Sustainable Development - University of Malta

Published by lccsd Malta · 4 November 2019 ·

Cycle to UM campaign 11-15 November.

During this campaign, bicycles parked in bicycle racks within the University of Malta Msida Campus will be randomly selected for a gift by the Green Travel Plan Coordinator 🍷



GO GREEN & CYCLE TO UM!
get healthier | save time | reduce pollution



11-15 November

Multi-Modal and Active Travel to University Campaign

During **February and March 2020**, as a continuation for the campaign *Multi-Modal and Active Travel to University* some of the participants were filmed on campus describing their experience during their commute. This experience was shared on UM social media, mainly Facebook and Instagram.



Mr Mike Rosner



This week, we're continuing our journey of inspiring people at University, striving to go green and as a result improving the quality of the Maltese environment one step at a time.

Mr Mike Rosner, an affiliate senior lecturer at the University of Malta, travels to Campus using alternative transportation. Cycle commuting from the Rabat area to University, Mr Rosner only takes 25 minutes, and has never experienced getting trapped in a loop while attempting to finding a parking spot.

Be like Mr Rosner, and change the way you commute back and forth.



Ms Samantha Pace Gasan



Our journey towards a healthier, greener way of travelling to and from University continues. This week we're meeting with Ms Samantha Pace Gasan.

Ms Pace Gasan expressed with Newspoint that "some individuals are taking responsibility for being part of one of the main daily struggles: the problem leading to polluted air, never ending traffic and lack of parking spaces."

Samantha Pace Gasan, a research support officer at the University of Malta, commutes by bus on a daily basis to and from work. She stated that although the public transport service can improve, there might be some myths revolving around it. Despite this, Samantha expressed her satisfaction with the current public transport system, and encourages you the reader, to "try it out and see for yourself!"

Be like Samantha, and leave a better environment for generations to come.



Dr Michelle Attard Tonna



This week we're meeting with Dr Michelle Attard Tonna as we discover more people who are taking greener initiatives for transportation.

Dr Attard Tonna expressed with Newspoint that commuting with her bike to University is very efficient and there are no traffic or parking problems. She added that using this mode of transport allows her to know exactly the travel time needed to commute, while keeping a greener and practical lifestyle.

Be like Michelle, and travel stress-free.



Dr Leonie Baldacchino



With the Maltese Islands being heavily inundated with cars bustling down each street, horns honking, and pollution in the air, a group of people are taking their own initiatives to counteract this.

Dr Leonie Baldacchino, a senior lecturer at the University of Malta, is one who is actively seeking greener ways of travelling to the Campus.

She has been travelling to UM with her motorcycle since she was a first year undergraduate student.

Be like Dr Baldacchino, and change the way you commute back and forth.

Installation of Active Travel Signage

In **February 2020** a pair of doctorate researchers at the Institute in conjunction with the GTP Coordinator installed the first information poles on UM Msida Campus. These contain updated information on walking and cycling distances from University to surrounding localities and vice versa. During the opening ceremony the GTP Coordinator added that *“This initiative is great as it would change the perception of actual distance and time to commute around UM boundary localities. This will eventually encourage people to experiment more with their daily travel and switch to alternative modes which have a better impact on the environment and their health and wellbeing”*.

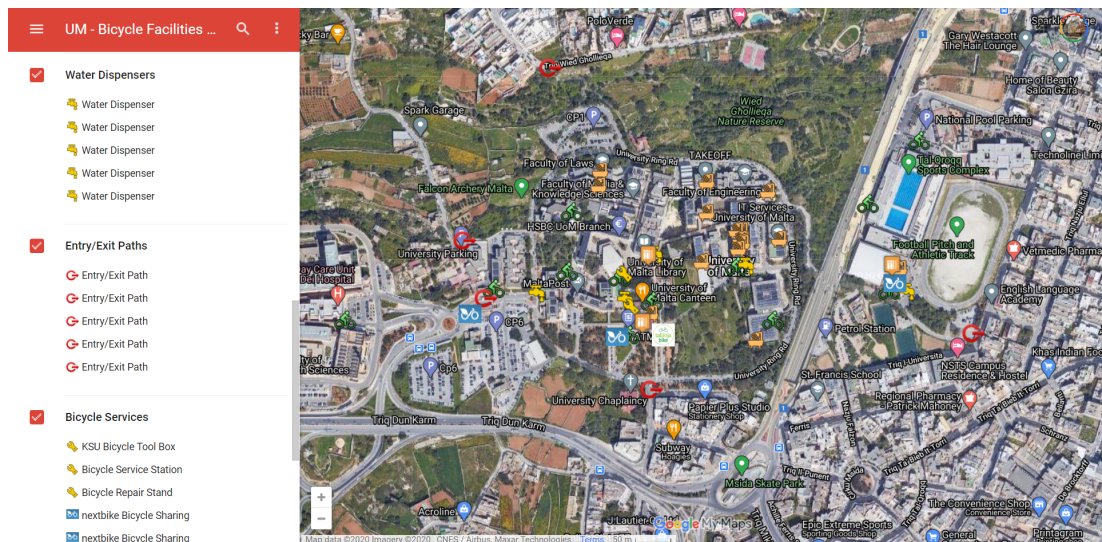
Following this opening ceremony more poles were installed at San Gwann, Birkirkara, Msida and Gzira.



UM Bicycle Facility Map Update

During **May 2020** the GTP Coordinator updated the *UM Bicycle Facility Map* which contains seven different layers; Bicycle Racks, Student Showers, Staff Showers, Water Dispensers, Entry/Exit Paths, Bicycle Services and Lockers.

The map which is constructed with Google Maps has increased views by more than 3,500 since last year, amounting to a total of 10600.



Green Travel Plan Website Update

During **July 2020** the GTP Coordinator updated the 'Getting to UM' page. This page consists of various options on how one can arrive to Msida campus, on foot, by bicycle, by bus and by car. The URL of this page is: <https://www.um.edu.mt/gettingtoun>

L-Università ta' Malta

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University of Malta main campus is situated in Msida, next to Mater Dei Hospital, a prime location reached easily by bus from all the localities. Some of the other UM campuses such as Junior College, Gozo and Valletta are also well served by transport links.

The following is a list of various sustainable transport methods you may use to reach UM Msida Campus.

- on Foot +
- by Bicycle +
- by Electric Bicycle/Scooter +
- by Bus +
- by Car +

Travelling smart +

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Find a course: enter keywords



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- Undergraduate prospectus
- Postgraduate prospectus

Participation in International Scientific Committees

Academic members of staff of the Institute have participated and contributed to a number of scientific committees and conferences during the period under review. Below is a list of contributions.

Prof. Maria Attard was member of the Scientific Committee for the 4th European Congress of Qualitative Inquiry. QI towards Sustainability organised by the University of Malta, Malta, 5th-7th February 2020.

Prof. Maria Attard was member of the Scientific Committee for the AIIT 2nd International Congress on Transport Infrastructure and Systems in a Changing World. Towards a more sustainable, reliable and smarter mobility organised by the Italian Association of Traffic and Transport Engineering, Rome, 23rd-24th September 2019.

Prof. Maria Attard was member of the Scientific Committee for the Symposium Oceans and Climate Change: towards a better understanding and handling of the impacts of climate change to oceans, biodiversity and livelihoods organised by Hamburg University of Applied Sciences (Germany), Manchester Metropolitan University (UK) and the International Climate Change Information Programme (ICCIP), in cooperation with the University of Malta, Malta, 11th-13th June 2019.

Prof. Maria Attard was member of the Scientific Committee, Topic Area Manager and Session Organiser on Urban Transport Planning and Policy for the 15th World Conference on Transport Research organised by the World Conference on Transport Research Society (WCTRS), IIT Bombay, Mumbai (India), 26th- 31st May 2019.

Prof. Maria Attard was member of the Scientific Organising Committee for Urban Transitions 2018 Conference organised by Elsevier, Sitges (Spain), 25th- 27th November 2018.

During the period under review **Prof. Maria Attard**, **Ms Thérèse Bajada** and **Ms Deborah Mifsud** acted as paper reviewers to a number of academic journals including Case Studies in Transport Policy (Elsevier), Journal of Transport Geography (Elsevier), Transportation and Research Part A: Policy and Practice (Elsevier), Transport Reviews (Taylor and Francis), Transport Planning and Technology (Taylor and Francis), Travel Behaviour and Society (Elsevier), Journal of Transport Geography (Elsevier), ICE (Institute of Civil Engineers) – Transport (ICE), European Transport Research Review, Journal of Transport and Health (Elsevier) and Journal of Environment Science and Management, Transportation and Research Part A: Policy and Practice (Elsevier).

Other staff news

Ms Deborah Mifsud and **Dr Thérèse Bajada** have continued to support the MATSEC Boards for Geography and Environmental Studies.

Dr Thérèse Bajada was awarded 3rd place in a competition on sustainable mobility ideas organized by Project Aegle Foundation.

Dr Thérèse Bajada supported the Edward Debono Institute for Innovation and Creativity in the organisation of the Creativity and Innovation Week in April 2019.

Ms Margaret Camilleri Fenech delivered a presentation entitled “Exploring Approaches to Nudge for Sustainable Practices: A Hackathon” as part of a mini-hackaton organised jointly with the Edward Debono Institute for Innovation and Creativity.

Ms Suzanne Maas secured Erasmus+ funding to visit the Lab for Transport Engineering at the University of Cyprus for a 2-month period between March and May 2019. She then went on to organise a 3-week fieldwork visit to Las Palmas de Gran Canaria in July 2019. This work is linked to her PhD she is currently reading with the Institute.

Ms Suzanne Maas held the position of Postgraduate Representative of the Transport Geography Research Group of the Royal Geographical Society and organised two sessions for postgraduate researchers during the RGS Annual Conference in London 27-30 Aug 2019.

Prof. Maria Attard was invited to deliver the following talks/keynotes:

The growing gap between active travel polic and practice: impacts on environment and health Invited keynote at the **XXII Conference of the Italian Association of Transport Economics and Logistics (SIET)**, organised online 17-18 September, 2020.

The Maltese Environment and Health Invited speaker at the Seminar entitled **The Maltese Environment and Health**, organised by the Faculty of Health Sciences, Verdala Palace, Malta. 11 February 2020

Sustainability – the need for more qualitative research Invited keynote at the **4th European Congress of Qualitative Inquiry. QI towards Sustainability** organised by the University of Malta, Valletta, Malta. 5-7 February 2020.

Urban Transport Inequalities: the case of Malta Seminar organised by the **Planning and Transport Research Centre (PATREC)** at the Australian Urban Design Research Centre, Perth, Australia. 12 December 2019.

The Right to the Road Invited speaker at the **Malta Sustainability Forum 2019** organised by APS Bank. Westin Dragonara Resort, Malta. 14 November 2019.

Why Active Travel? Invited keynote at the **Active Travel and Technology Symposium** organised by the Institute for Climate Change and Sustainable Development, University of Malta. University of Malta, Malta. 30 October 2019.

Walkability and Accessibility Invited keynote at the **2019 Local Councils Association Annual Congress**. Salini Resort, Salini Bay, Malta. 26 October 2019.

Dr Thérèse Bajada delivered the following presentations:

Local Agenda 21 Individual Deeds towards Sustainability. Presented for Hilton Event for Employees Reduction of our Environmental Footprint, Hilton Malta 3 December 2019 with Mr Raphael Mizzi

The Institute for Climate Change and Sustainable Development, Presented at the Faculty of Health Sciences for the PROTECT school Predictive modelling tools, Mater Dei 13-17 January, 2020.

Better Information for Smarter Decisions. Presented at the THINK Soapbox, Valletta Malta 21 July 2020.

Prof. Maria Attard co-edited three Journal Special Issues:

Attard, M., Ison, S.G. (2020) *Urban Transport*. Journal Special Issue in Research in Transportation Business and Management, Vol. 36.

Ison, S.G., Budd, L., Attard, M. (2019) *Women, Employment and Transport*. Journal Special Issue in Research in Transportation Business and Management Vol. 31.

Mifsud, D., Attard, M. (2019) *Ageing and Mobility*. Journal Special Issue in Research in Transportation Business and Management Vol. 30.

The Director of the Institute **Prof. Maria Attard** served as member of a number of Boards and Committees during this year. These included

- Evaluator for the **BELSP0 BRAIN-be 2.0** Pillar 3 "Federal societal challenges" Work Programme 2020 (Belgium).
- Evaluator for the **European Science Foundation (ESF)** Work Programme 2020 (Belgium).
- Senior Jury Member, 2019 **RegioStars Awards, European Commission, DG Regio**.



- Panel Chair and Evaluator for the **European Research Council (ERC)** Work Programme 2018 and 2020, Brussels, Belgium
- Member of the Internal **SEA-EU (European University of the Sea)** Quality and Ethics sub-committee at the University of Malta.
- Advisory Board Member, EU Funded Project **EU-Citizen.Science**. Led by the Museum of Natural History, Leibniz Institute for Evolutionary and Biodiversity Research, Berlin, Germany.
- Visiting External Examiner, PhD Thesis Diego Parajito, Universitat Jaume I (UJI), Castellon, Spain 21-24 November 2018.

Staff Publications for 2018-20

Attard, M., Ison, S.G. (2020) Urban transport. (Volume Editors). *Research in Transportation Business and Management* 36, 100594.

Wang, S., Zhen, L., Xiao, L., Attard, M. (2020) Data-Driven Intelligent Port Management Based on Blockchain. *Asia-Pacific Journal of Operational Research*, 2040017. DOI: 10.1142/S0217595920400175

Cañas, C., Attard, M., Haklay, M. (2020) A citizen science approach to assess the perceived walkable environment and identify elements that influence pedestrian experience at the University of Malta. In Tira, M., Pezzagna, M., Richiedei, A. (eds) *Pedestrians, Urban Spaces and Health*. CRC press, London. DOI: 10.1201/9781003027379

Papantoniou, P., Yannis, G., Vlahogianni, E., Attard, M., Regattieri, A., Piana, F. Pilati, F. (2020) Developing a Sustainable Mobility Action Plan for University Campuses. *Transportation Research Procedia* 48, 1908-1917.

Maas, S., Attard, M., Caruana, M.A. (2020) Assessing spatial and social dimensions of shared bicycle use in a Southern European island context: the case of Las Palmas de Gran Canaria. *Transportation and Research A: Policy and Practice*. Vol. 140, 81-97.

Bugeja, M., Dingli, A., Attard, M., Seychell, D. (2020) Comparison of Vehicle Detection Techniques applied to IP Camera Video Feeds for use in Intelligent Transport Systems. *Transportation Research Procedia* 45, 971-978.

Maas, S., Attard, M. (2020) Attitudes and perceptions towards shared mobility services: Repeated cross-sectional results from a survey among the Maltese population. *Transportation Research Procedia* 45, 955-962.

Attard, M. (2020) Mobility justice in urban transport. *Transportation Research Procedia* 45, 352-359.

Attard, M., Camilleri, M.P.J., Muscat, A. (2020) The technology behind a shared demand responsive transport system for a university campus. *Research in Transportation Business and Management*, 100463.

Casado-Sanz, N., Guirao, B., Attard, M. (2020) Analysis of the Risk Factors Affecting the Severity of Traffic Accidents on Spanish Crosstown Roads: The Driver's Perspective. *Sustainability*, 12, 2237. doi:10.3390/su12062237

Camilleri-Fenech, M., Sola, J.O., Farreny, R., Durany, X.G. (2020) A snapshot of solid waste generation in the hospitality industry. The case of a five-star hotel on the island of Malta. *Sustainable Production and Consumption*, 21, 104-119.

Yi, W., Wang S., Attard, M. (2019) Construction site layout for minimization of transportation cost: step-by-step teaching approach. Proceedings of the 24th International Conference of Hong Kong Society for Transportation Studies (HKSTS) Transport and Smart Cities. Edited by A. Chow, S.M. Lo, L. Li. pp 333-337.

Camilleri, M.P.J., Muscat, A., Buttigieg V.J., Attard, M. (2019) VJAGG A Thick-Client Smart-Phone Journey Detection Algorithm. Submitted to Journal of Pervasive and Mobile Computing

Mifsud, D., Attard, M., Ison, S.G. (2019) An exploratory study of the psychological determinants of mobility of older people in Malta. Research in Transportation Business and Management Vol. 30, 100373.

Casado-Sanz N., Guirao, B., Galera, A.L., Attard, M. (2019) Investigating the Risk Factors Associated with the Severity of the Pedestrian Injured on Spanish Crosstown Roads. Sustainability. Vol. 11, pp 5194.

Vlahogianni, E., Papantoniou, P., Yannis, G., Attard, M., Regattieri, A., Piana, F., Pilati, F. (2019) Analysis of Mobility Patterns in Selected University Campus Areas. In: Nathanail E., Karakikes I. (eds) Data Analytics: Paving the Way to Sustainable Urban Mobility. CSUM 2018. Advances in Intelligent Systems and Computing. Vol. 879. Springer.

Papantoniou, P., Vlahogianni, E., Yannis, G., Attard, M., Valero Mora, P., Campos Diaz, E., Tormo Lancero, M.T. (2019) Investigating Mobility Gaps in University Campuses. In: Nathanail E., Karakikes I. (eds) Data Analytics: Paving the Way to Sustainable Urban Mobility. CSUM 2018. Advances in Intelligent Systems and Computing, Vol. 879. Springer.

Attard, M. (2019) Exploring the potential of LRT to encourage urban regeneration and support more sustainable commuting to and from Valletta. In Ferbrache, F. and Knowles, R. (eds) Transit Oriented Development and Sustainable Cities: economics, community and methods, Edward Elgar Publishing. Chapter 4.

Attard M. (2019) The Sustainability of Landforms and Landscapes. In: Gauci R., Schembri J. (eds) Landscapes and Landforms of the Maltese Islands. World Geomorphological Landscapes. Springer, Cham

STUDENT RESEARCH

Precious Shola Mwamulima M.Sc. (Melit.)

FOOD, GENDER AND CLIMATE CHANGE

The choices we make about the food we eat have major ramifications on personal human health and global ecological health. Food production occupies more than one third of global land areas and accounting for ~30% of total greenhouse gas emissions (GHGE) of which 80% is livestock, collectively intensify climate change. Simultaneously, food ecosystems shape an oxymoron of overconsumption with diet-related noncommunicable diseases being the number one health burden, alongside underconsumption of one billion hungry people, all compounded by food losses and waste. Thereby, floating the question of the sustainability of diets. For the study, representative national nutrition datasets on food production and consumption in the Malta, Brazil, Australia, India and Zambia were used with meta-analysis food emission estimates. Four variant diets of vegan, vegetarian, World Health Organisation (WHO) recommended diet and Food and Agriculture (FAO) reference diet scenarios modelled for 2050 projections with the reference year 2005/7. Life cycle assessment (LCA) quantified diet-related emissions of animal and plant-based foods and global warming potential (GWP) assessed emissions from land use along three inventory indicators of ammonia emissions, land use and blue water within cradle-to-store system boundaries with a special focus on gender. The study found that none of the case studies can meet the FAO projections by 2050 showing a dire need for current diet transition. WHO diets would cut GHGE by 31.2%, vegetarian (66%); vegan (74%). The GWP is higher in men all countries due to a higher share of red meat. The largest absolute environmental benefits result from diet shifts in Zambia and India whereas Australia, Malta and Brazil gain most in per capita terms. In conclusion, red meat GHGE is nearly twice those of vegans, therefore reduced red meat consumption substantially reduces dietary GHGE. The study also shows that within one society two distinct diets with differential environmental impacts exist. Taking the interplay of culture and physiology among the genders can develop Climate Change adaptation and mitigation policies for operative interventions allowing sustainable diets with reduced GHGE. Limitations in the study were the system boundaries that restricted to set of environmental indicators and only English literature reviewed. Future work should delve into the epidemic of counterfeit foods fuelled by demand for processed foods with implications on the environment, health and economies.



Precious Shola Mwamulima completed her MSc research in 2019 under the supervision of Prof. Simone Borg

Ing. Anthony G. Rizzo B.Mech.Eng. (Hons), M.Sc. (Melit.)

CLIMATE CHANGE VULNERABILITY RANKING OF COASTAL ROADS IN MALTA USING MULTI-CRITERIA METHODS

The ranking of coastal roads according to their vulnerability to climate change is a complex issue. In order to increase the quality of life and community sustainability, the environmental and social sustainability of coastal roads must also be considered. Indicators of vulnerability are profiled, on the IPCC-based vulnerability concept and defined as a function of Climate Exposure, Sensitivity and Adaptive Capacity. These dimensions need to be considered during the ranking process and can be modelled as a Multiple Criteria Decision Making (MCDM) problem. This study proposes an approach which integrates the results of different MCDM methods to provide a ranking model for climate change vulnerability of coastal roads in Malta. This approach combines six objective weighting methods made up of eleven climate change vulnerability indicators and applies them to rank the climate change vulnerability of six coastal roads using five MCDM methods. The results indicate different rankings. Following this initial phase two other MCDM methods were used to provide a definitive ranking. The results indicate that the proposed approach can integrate the inconsistent evaluation results of different MCDM methods and produce a coherent ranking of climate change vulnerability of coastal roads. The study provides policy and decision makers with a definition of a coastal road, an inventory of such roads, a list of climate change impacts and a mathematical model that incorporates climate change vulnerability indicators. The model can be used to prioritise investment and plan climate change adaptation strategies for infrastructural works on coastal roads.

Ing. Anthony G. Rizzo completed his MSc research in 2019 under the supervision of Prof. Maria Attard



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