

2020—We've got the whole world in our hands

Letter from the Editor...

Welcome to the latest edition of the:

"InnoVenton Times".

To all our readers, 2020 has turned out to be a year with a black swan event, Covid-19 hovering about. This brought about a whole new dynamic to the way we operate, luckily new opportunities also came our way. Our hand rub sanitizer projects took center stage this year as we joined the National effort to slow the spread of the Corona Virus at our university and in our community. A Companies and Intellectual Property Certificate issued to InnoVenton during Level 5 of the lockdown, permitted us to join efforts to fight the virus. The Hand sanitiser project in partnership with SASOL and the Nelson Mandela University was a highlight this year, demonstrating what collaboration and engagement can achieve if we work together. The dedication of our staff in their determination to see this project succeed was truly inspiring.

InnoVenton developed and presented two Short Learning Programs to SME's these were "A practical introduction to IoT and user interface programming" and "An introductory guide to Cosmetic Formulation". An additional SLP will be on offer next year entitled, "Process Safety".

In this edition we take a look at developments and highlights for some of the Technology Development Projects we tackled during the year. Determination, hard work and co-operation resulted in some successful outcomes of which we can be proud.

Online learning platforms at the University allowed InnoVenton to continue with focused efforts for staff to continue with professional growth and development linked to technical and managerial training programs. MS Teams and Zoom have become just another way we communicate with our stakeholders, colleagues and customers.

To our stakeholders and partners, thank you for supporting and connecting with the Team at InnoVenton, your contributions, collaborations and industry relevant advice goes a long way in enabling us to identify ways that we can be of service. Much can be achieved through our joint initiatives.

To our staff, it's been 15 years of hard work, sweat and tears. Look how far we have come, I hope this edition will give you renewed enthusiasm as to what we can achieve with the skills and talent we have at InnoVenton. I want to encourage you to continue to build, to dream, to hope for a better future as we continue to navigate the challenges that come every day. Delight and surprise our customers. Amaze our stakeholders. And always remember that making a difference in the lives of others, through the endeavors of our work at InnoVenton, shows and establishes purpose...—Melissa



IS YOUR HAND SANITISER DOING ITS JOB?

Alcohol content is key.



PRODUCTION OF HAND SANITISER AT INNOVENTON FOR THE NELSON MANDELA UNIVERSITY AND COMMUNITY BENEFICIARIES



InnoVenton has been producing alcohol-based hand sanitisers for our University at the onset of lock down level 5. The institute responded to the national state of disaster by producing ~13 000L of hand sanitiser for use by staff and students.



Through this process we have learned a great deal regarding the manufacturing process and requirements that go with this activity. We have also validated a rapid quality control test method for determining the alcohol content of finished hand sanitiser product. We provide a hand sanitiser testing service and have shared hand sanitiser production information with small to medium enterprises (SMEs) across the Eastern Cape.

InnoVenton is well placed and mandated to provide technical assistance to potential manufacturers and start up manufacturers of alcohol-based hand rub sanitiser where it falls within our capability and capacity. We have received several enquiries in relation to the availability and manufacturing of alcohol-based hand rub sanitiser following the outbreak of Covid 19.



Photos Above: The 250ml and 5L bottles of hand rub sanitizer distributed by the University, produced at InnoVenton (Mr Hlumelo Mji, an Intern at InnoVenton who volunteered to assist).

Hand sanitiser formulation, production and logistics were carried out by, InnoVenton staff from left, technician Mr JJ de Jongh, product developer Dr Nicole Vorster, facilities manager Dr Melissa Gouws, intern Mr Hlumelo Mji and acting director Dr Gary Dugmore. As the projects started to gain momentum more staff joined the Team to get the job done, namely Mr Luvuyo Ndyenga, Dr Shawn Gouws, Mrs Louise Hamilton, Mr Philip van Zyl, Mr Sifundo Duma, Miss Nolundi Maninjwa to name a few. Mr Unathi Plaatjies and Mrs Mildred Mpalala helped with decanting and labelling the bottles. The first batches of the sanitiser were decanted so that staff who man key entrances can spray the hands of staff, students and visitors using the university.

InnoVenton produced its first batch of 200 litres of sanitiser for the Nelson Mandela University, within two working days. The sanitiser meets the standard requirement of having a 70% alcohol content, to be effective. The sanitiser is being produced in InnoVenton's Kilo Lab pilot plant, which is readily equipped for the synthesis of chemicals as well as distillation of flammable solvents, such as alcohols.



Photo Above: Ms Nolundi Maninjwa and Mr Philip van Zyl help with decanting 7000 bottles for Nelson Mandela University students.

The University entered into a partnership with Sasol, leveraging the institution's Institute for Chemical Technology and Downstream Chemicals Technology Station, with the support of the Technology Innovation Agency (TIA), to boost production and provision of free hand sanitisers to communities in need. The production capacity developed was used to process Sasol Ethanol and produce between 400 and 500 litres of hand sanitiser per day. This was distributed to beneficiaries at risk in the Eastern Cape, jointly identified with Sasol. The University's Community Convergence Workstream (CCW) played a key role in working with Community Organisations to ensure that the sanitizers reached those who needed it the most. To date, 35 000 litres of hand sanitiser have been produced and distributed.

Our own Nelson Mandela Bay Fire Department helped with Flammable solvent permits and ensured we had a safe working and storage environment. From Left to Right: Dr Shawn Gouws (InnoVenton), Mr Fred Hendricks, Ms Noksi Gqokoma and Mr Brent Comely.



Photos: Production of Hand sanitiser at InnoVentons kilo lab facility and the 25L Drums (below) produced in partnership with SASOL. Mr JJ De Jongh and Mr Luvuyo Ndyenga mixing and bottling the batches of sanitiser.





It took a Team of organisations to pull this off, we have to acknowledge our partners:



Community Convergence Workstream



Photo: Representatives from the Department of Education in Humansdorp receive hand sanitiser for vulnerable schools identified in their district. From left to right; Mr Simphiwe Mgoduka, Dr Melissa Gouws (InnoVenton), Ms Dunyiswa Ndzulwana, Mr Graham Morris and Mr Fumanekile Moni.



Unathi Meslane from the Ikala Trust receiving Hand sanitiser, here with Dr Melissa Gouws.



Below: Mr Morne May and Dr Bruce Damons helping with deliveries to the community.



InnoVenton



Yoliswa Mgobo, a representative from the Department of Education in the Eastern Cape transporting Hand sanitiser to local schools.

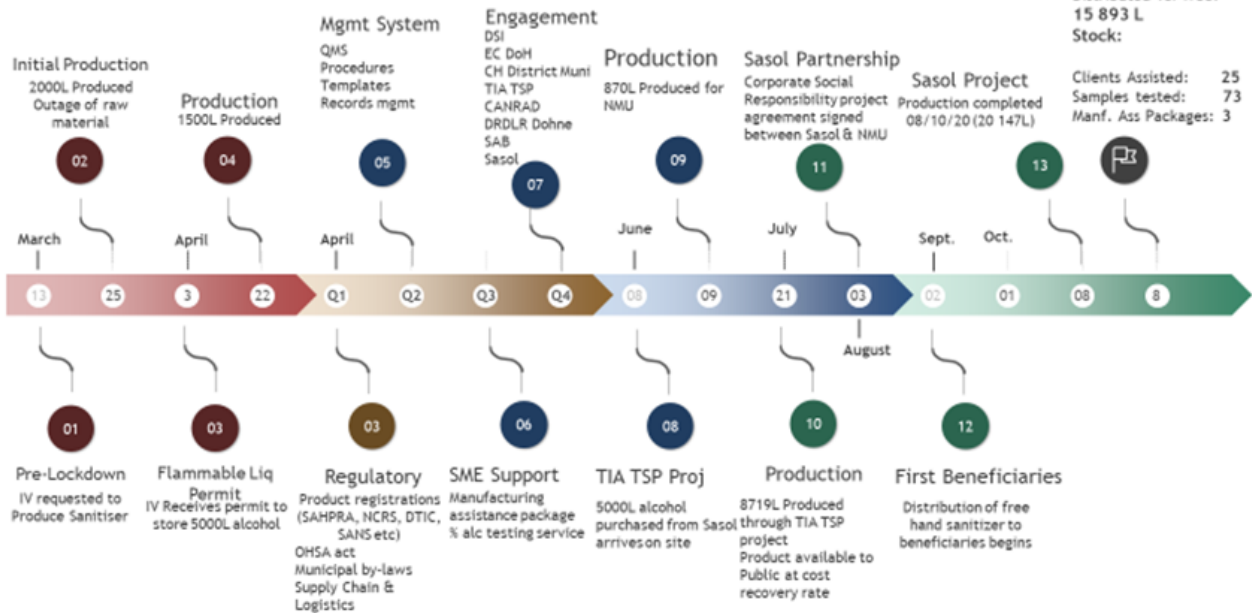
Many requests have been received for the supply of hand rub sanitiser to government departments, schools and the wider community. We have a limited production capacity and cannot possibly meet this demand, it is also not the mandate of a Technology Station to manufacture products but rather the Technology Station role is to support and enable industry sectors to establish manufacturing capacity and to provide technical support once established.

We have therefore compiled and offer a manufacturing assistance package to prospective manufacturers of alcohol-based hand rub sanitiser that we will make available for a nominal fee of R250.00 to clients registered with InnoVenton DCTS. We will also provide further technical support services for hand rub sanitiser manufacture on request of clients where it falls within our scope, capability and capacity. We look forward to engaging further with you and assisting with establishment of manufacturing capacity for alcohol-based hand rub sanitiser.—Dr Melissa Gouws

InnoVenton continues to respond to client needs through provision of technology support services that include **consultation & feasibility studies, non-routine testing, prototyping & toll sample preparation, technology demonstration and short learning programs.**



InnoVenton Covid Response: Hand Sanitiser



Proposed Infrastructure Facilities

Project

InnoVenton has proposed an infrastructure project to University through the Faculty of Science. The purpose of which is to address Health and Safety Non-Compliance, Maintenance and Spatial Repurposing at InnoVenton, to set up and develop well founded laboratories at the institute. This will entail refurbishment of selected laboratory spaces, installation of fume cupboards and much needed maintenance. Plans, cost estimates and design scope have been compiled and form part of this submission.



Fire Damage Assessment Chloride Testing

Insurance assessors need to determine the damage done to electronic equipment after a fire had caused damage at any facility. InnoVenton can help them establish the extent of the damage by carrying out a simple chloride residue test. This year we processed over 250 samples for this industry.

PRODUCT DEVELOPMENT

In 2020 three entrepreneurs brought forward 10 products including facial cosmetics, hair tonic and sunscreen for further development at InnoVenton. Vuvu and Co (one of the formulation entrepreneurs) has also been incubated by Propella and has a business mentor to help her take her formulated product to the next level.

InnoVenton Collaborations

Would you and your Team like to collaborate with
InnoVenton ?

For more information contact Dr Gary Dugmore .
E: Gary.Dugmore@mandela.ac.za /T: 041 504 3482

MATKEN Copolymer Project



This project is the Development of a process using an alternative natural raw material for a local SME, MATKEN (Pty) Ltd. and is subsidised through the Technology Station Core Grant. The project proposes the synthesis of 3-n-propyl phenol from eugenol (2-Methoxy-4-(prop-2-en-1-yl)-phenol) contained in clove oil. We have demonstrated laboratory methods for the hydrogenation of the double bond in the propyl side chain using Raney Nickel, P-1 Nickel Boride, and Pd/C catalysts as well as the de-methylation of the methoxy group to phenol group. Synthesis of the methyl and p-toluyyl sulphonate derivatives of eugenol were proven in the laboratory. Acceptable conversion in the hydrodeoxygenation of the sulphonate intermediate has not yet been successful.

Only once the synthetic steps have been proven can the process be optimised in the laboratory with a view to a practical, scalable process that meets the requirements of the client.



InnoVenton Downstream Chemicals Technology Station

From its inception the Technology Station activities at InnoVenton have been fully integrated into the larger institute to maximise the impact that we have externally.

InnoVenton/DCTS strives to provide specific technology support and innovation in the areas of:

- Product replacement; extension or formulations
- Improving production/process flexibility;
- Reducing production lead times; Reducing environmental impacts; improving product quality; improving working conditions/safety;
- Providing expert technology, analytical, testing services; and
- Providing custom designed short learning programs for industry
- Kilo-lab, Distillation and Process Plant Facilities
- TIA Seed Funded Projects, Major Projects and Youth development Projects.

Enquiries: Mrs Louise Hamilton
Technology Station Manager
T 041 504 3953

More than R1.2 Million for student bursaries

During 2020 InnoVenton managed to raise and pay over R1.2 Million in bursaries to under-graduates. The support for our students came from a wide variety of sources; scholarships and grants from industry, accommodation and study-fee support from the Chieta, internships from TIA, and some internal InnoVenton funds. AECI, AIP, BASF, and Heraeus sponsored students so that they could complete their in-service training in 2020 and gain some industry experience. With Covid, an ever-present threat to the students being able to complete the year, the generosity and support of our stakeholder industries made all the difference. - Dr Shawn Gouws.

InnoVenton

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Product Formulation

Have you ever wanted to Formulate your own product?. But weren't sure where to start.?

InnoVenton can help you understand how to mix and blend various components in a way so that they don't react but instead interact to provide a final product with very specific desired properties or functions.

You would have access to Chemical Research and Development expertise and Technology Support as you design your formulation.

Some products developed in our laboratories include: personal care products, household cleaning products, pharmaceutical products, industrial chemical products and water treatment products to name a few.

We would help you design and optimise your formulation.

Enquiries: Mrs Louise Hamilton Technology Station Manager T 041 504 3953

InnoVenton

Our role is to provide technology support services, skills development training and a technology development capability for basic research and client projects. This includes improving the alignment of basic research and formal teaching with needs.



BIO ECONOMY: Low cost Spirulina Cultivation

This project received funding from the Technology Innovation Agency Agricultural Bio-economy Partnership Program and proposes to demonstrate a low tech, cost effective, high yield Spirulina cultivation system based on a simple bucket system (photograph below) to produce fish (animal) feeds. The bucket-based growth system has been designed and installed to scale up a spirulina culture and seed the system. The expected output is a Technology Transfer Package.

BIO ECONOMY: Phycocyanin production and extraction

This project received funding from the Technology Innovation Agency Seed Fund via the NMU Innovation Office. The project aims to optimise the production of phycobiliproteins, particularly phycocyanin, from *Arthrospira*. The project will investigate and optimise methods that affect phycocyanin production and extraction from the protein complexes through the comparison of various protein extraction methods and phycocyanin release. Critical path activities have been addressed, which includes procurement of the Tangential Flow Filtration (TFF) and pH control systems. We have selected the low-tech bucket system tested at InnoVenton as an appropriate low tech, fit for purpose and scalable cultivation system for *arthrospira*. The aim to development the preliminary technology package through pilot scale production (TRL 6) for eventual deployment by an entrepreneur.

Extraction of oil from algae for CONTEXTUALIZE

This technology support service involved the extraction of lipids from algae which would be used as an additive in Polypropylene extrusion for a company, Contextualize.

COALGAE® ACCELERATED TRANSPORT FUELS

This project is a continuation of the InnoVenton algae to energy Coalgae® project and is currently funded by the DST (Hydrogen & Energy Directorate). The project is in the final year of the three-year funding cycle. The main objective of the current cycle was to demonstrate the technologies for production of liquid transport fuel components from Coalgae® feedstock via coal to liquid and pyrolysis processes.

The progress made during year to date 2020 on completing the contracted deliverables of this funding cycle is summarised below (see attached full project report as at 30/09/2020 submitted to DSI):

In January 2020 we started an algae growth trial whereby we intended to produce algae in a continuous integrated production mode. We operated in two of our ponds at InnoVenton, one with PBRs, as per the engineering design, and one simple raceway pond with no PBR's as a control. Control limits for all parameters were established, operating procedures were drawn up and the algae was grown and harvested accordingly. This operational mode algae growth trial was started with the aim of confirming the operability of an integrated system and to firm up the algae yield, nutrient and water recycle numbers in the Coalgae business model.

The Covid19 pandemic and subsequent quarantine lock down caused scheduling setbacks for this project. On 25 March, operations at Nelson Mandela University were halted. Two staff members kept the algae culture alive by cultivating it in two 40 litre buckets each, at home during the lockdown. On 1st June, some staff members were issued with permits to resume operations and the buckets of algae culture were brought back on site and used to inoculate a single seed colony. This seed colony was grown then split into two then three until finally a single small raceway pond was started. Once this pond was at sufficient strength, a single large pond with PBR's fitted was started. This pond was divided into another pond with no PBR's and grown up to full volume.

These two ponds served to supply algae from which to produce Coalgae® for further gasification and pyrolysis experimentation and served to restart the small scale Coalgae® production demonstration.

Stabilisation of pyrolysis oil using sulphided Nickel Molybdenum catalyst was completed. To achieve this, we harvested algae on a filter press using fine coal as filter-aid. The produced wet cake was extruded to form Coalgae® pellets which were dried and conditioned in an oven. This process is the complete, integrated Coalgae® production process, described in the engineering study of 2014. As described in 2019, under: new designs and cost reduction – Improved harvesting system, the plate and frame filter is the most effective technology for producing Coalgae®. This has been proven operationally, by routinely producing Coalgae® using this harvesting method.

Previously, we could not detect any difference in the syngas composition between Coalgae® and its hard, glassy fine coal parent. During this year we compared the syngas quality from Coalgae® made from A-grade coal fines to pelletized A-grade 10% Coalgae® and found the same effect.—Dr Gary Dugmore



YEAST Spray Drying

National Feed Traders approached InnoVenton to assist them with spray drying 800L of waste yeast slurry as a test sample. The scope of the project included amongst other things, determining the % solids, dry the yeast and analyse the spray dried product accordingly.



InnoVenton Technology and Specialized Development

InnoVenton/DCTS strives to provide technology support and innovation in specialist areas of:

Research

- Applied Chemistry in Product and Process Development

Teaching and Learning

- Formal qualifications and non-formal short courses.

Engagement and Services

- Technology Support
- Technology Demonstration
- Analytical and testing services
- Quality services

An Introductory Guide to Cosmetic Formulation

This workshop gives delegates the chance to evaluate their formulation ideas; grasp an understanding of formulation technology and learn about packaging and regulatory requirements related to their products. The target audience are investors and entrepreneurs who would like to acquire basic tools to better understand and evaluate their ideas.



InnoVenton Presents

An introductory Guide to Cosmetic Formulation

Are you interested in setting up your own natural skin care business, but don't know where to start? Join us for a day to find out. You don't even need a scientific background.

The course will cover

- Evaluating your formulation idea
- Introduction to formulation terminology and the language of formulation
- Packaging and Regulatory requirements



Who should attend? Inventors and entrepreneurs who would like to acquire basic tools to better understand and evaluate their idea

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Marketing Madness amidst a Covid Crisis

Visit by the Premier

InnoVenton was pleased to welcome the Eastern Cape Premier, Oscar Mabuyane to see our small production platform, used to manufacture Hand Sanitiser. Representatives from the Department of Health-MEC, Nelson Mandela University and Project stakeholders voiced their support for this initiative.



Premier Oscar Mabuyane with Dr Shawn Gouws (InnoVenton) and Prof Sibongile Muthwa our own Nelson Mandela University's Vice-Chancellor.



Yes, we had to try out the Hand sanitiser, everyone wanted to know what it smelt like, what it felt like and whether it would dry out your hands.



And lets not forget about the representatives from the press that followed.

At the end of the day we had a product that was fit for purpose.

Article in the Press: The Herald published; "*NMU scientists step in to help alleviate hand sanitiser shortage*" on the 19th March 2020, reporting on our first efforts at manufacturing hand sanitiser, this was the first formulation.

IOL posted the article "*This university couldn't wait for their hand sanitiser delivery, so they made their own*", you can find it at this link if you are interested: <https://www.iol.co.za/news/south-africa/eastern-cape/this-university-couldnt-wait-for-their-hand-sanitiser-delivery-so-they-made-their-own-45221237>

SABC NEWS broadcasted on 19 March 2020 that; "The Nelson Mandela University (NMU) has turned to its own experts and facilities to produce hand sanitiser, which is in short supply in Port Elizabeth. The university's institute for chemical technology managed to produce 200 litres of sanitiser in two days from its own raw materials."

Visit by the Deputy Minister



The Deputy Minister of Higher Education, Science and Technology, Mr Buti Manamela visited our facility and was given a tour of our Hand Sanitiser manufacturing capabilities in the Kilo Lab.

Right: Dr Gary Dugmore explained our process, challenges we faced and opportunities we want to take advantage of.



Internal Publicity for InnoVenton: This article published on the 4 March 2020 shows the sort of attention we were attracting to the institute and university as a whole.



Above: VC Prof Sibongile Muthwa, Premier Oscar Mabuyane, Health MEC Sindiswa Gomba and Executive Dean of the Faculty of Science Prof Azwinndini Muronga with some of the hand sanitiser donated by the University.

Nelson Mandela University's efforts in the fight against the novel coronavirus (COVID-19), particularly the institution's move to manufacture its own hand sanitiser in response to the national shortage, grabbed the attention of the Eastern Cape provincial government.

Eastern Cape Premier, Oscar Mabuyane, visited the University's chemical technology institute, InnoVenton, which has been manufacturing hand sanitiser in response to the national shortage in the wake of the novel coronavirus (COVID-19) pandemic outbreak.

The InnoVenton team, as led by Dr Gary Dugmore, initially manufactured the hand sanitiser for use by the University as part of its effort to prevent the spread of the virus. With the decreased need for the sanitiser on campus, as only critical on-site services remain on University premises, about 350 litres of the cleanser were donated to the provincial government to assist where it is needed most.

Accompanied by a delegation that included Health MEC, Sindiswa Gomba, and Bay Acting Mayor, Cllr Tshonono Buyeye, the Premier was in Nelson Mandela Bay to engage various stakeholders about their

work towards curbing the spread of COVID-19.

Mandela University Vice-Chancellor, Prof Sibongile Muthwa, said the institution had offered to avail its suite of skills and expertise to aid local and provincial government's efforts in the fight against the unfolding pandemic.

"We are known as a University in the service of society. As public universities, we have three missions – research and innovation, learning and teaching and engagement. Therefore, we have an obligation as a public university to respond in this manner; to stand and raise our hand, as it is very important for a university like ours, particularly as we are named after Madiba," said Prof Muthwa.

"We take engagement very seriously and feel that as being part of the community, we are part of this province and this province is ours. The wellbeing and wellness of the province, therefore, is very important to the life and sustainability of the University."

The University, through an MoU that is being developed with the Office of the Premier, will be working with provincial stakeholders to explore the various ways in which it can contribute to the broader fight against COVID-19. Details of this MoU will be shared once finalised.

While visiting InnoVenton, Premier Mabuyane expressed his gratitude for the excess sanitiser, saying it was a "patriotic gesture" by the University.

"We visited the University to appreciate the patriotic gesture that the VC and University as a whole has extended to the provincial government and to see where the sanitiser is manufactured," he said.

The front page article of the Faculty of Science Newsletter dated May 2020 was titled: "*The Faculty of Science, together with our other faculties, academics and the university leadership, have combined forces with hospitals, businesses and communities in the Nelson Mandela Metro to help fight Covid-19.*" It featured the work done by InnoVenton.

InnoVenton Services

InnoVenton continues to respond to client needs through provision of technology support services that include consultation & feasibility studies, routine analytical testing, non-routine testing, prototyping & toll sample preparation, technology demonstration and short learning programs

New Equipment Acquisitions

During 2020 the local chemical industry donated equipment towards training programs alongside our own purchase for projects, namely:

Endress & Hauser donated instrumentation to control a cheese making process to illustrate bio-processing to CPT students. The components donated include, conductivity and pH measurement devices, thermocouples and a PLC controller. The idea is to build-up this unit in 2021. The students will then have an opportunity to make their own cheddar cheese by monitoring the saltiness of the milk and cheese by means of conductivity and the alkalinity by pH. The process temperatures will be controlled through an external heating system. This will introduce them to the food processing environment and experience first-hand how chemical processing and clean operating procedures have relevance in that industry.



A tangential flow filtration unit was purchased from Sartorius for the phycocyanin project. The purpose of the unit is to concentrate phycocyanin extracted from Spirulina to produce a food grade product. The unit consists of a small peristaltic pump coupled to filtration units with the desired molecular weight cut off. The unit is capable of processing up to 5 L and multiple filtration units can be connected in series. The entire unit costs approximately R54 000.

STRICT COVID PROTOCOLS AT INNOVENTON ALLOWED OPERATIONS TO CONTINUE UNINTERRUPTED THROUGHOUT LOCKDOWN



At the onset of the Covid pandemic, InnoVenton put strict measures in place to ensure that we were able to continue operating during every "level" introduced by the country. Comprehensive work place plans, risk assessments and training protocols were drafted and put into place. A phased return to work process was followed, this in line with the universities guidelines. Wearing masks, an emphasis on personal hygiene, daily screening, checking in/out and social distancing processes are still being observed. We believe that the combination of these "new norms" and the diligence of our staff has enabled us to avoid any prolonged closure of the institute. We took on the challenge to adapt to changes in our work environment to keep things going.

NELSON MANDELA
UNIVERSITY

InnoVenton



IS YOUR HAND SANITISER DOING ITS JOB? ALCOHOL CONTENT IS KEY.

Put your product to the test with a quick, affordable laboratory analysis. All companies, schools and NPO's welcome.
#staysafe, backed by science.

Contact: Louise Hamilton, InnoVenton, Nelson Mandela University 041 504 3953 /louise.hamilton@mandela.ac.za

Change the World

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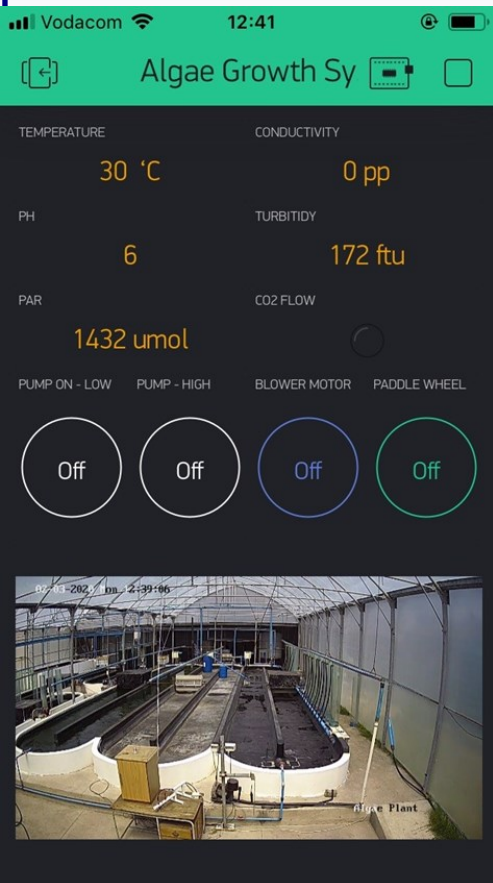


SAFETY IS THE NUMBER 1 PRIORITY. IF I SEE ANYTHING UNSAFE TAKING PLACE I CAN, AND WILL, STOP ALL ACTIVITIES.

A practical introduction to IoT and user interface programming workshop, leveraging project inspired knowledge for SME's

Run By: Derek Hislop

Two training sessions were held at InnoVenton, the course covered a practical introduction to the Internet of things (IoT) and user interface programming, making use of microcontrollers programming with cell phone applications. InnoVenton has successfully established capability to provide cost effective, fit for purpose remote and real-time monitoring and control solutions that can be leveraged to SME's that otherwise could not afford such technology.



This technology has been integrated into our Algae Growth System Monitoring and Control Project. The project has also enabled InnoVenton to develop and present a workshop based practical training offering "A practical introduction to IoT and user interface programming". This is proving a popular introductory course amongst our client/stakeholder base.

Funded from the Technology Station core grant, a real-time monitoring and control system was

developed for the algae growth system. The system has been demonstrated and can read and transmit sensors as defined in the design (Optical density, pH, temperature, motor run etc.) to the cloud and the data is retrieved to a user interface. An algorithm (at user interface) can send an on/off command back to a solenoid on the

CO₂ line based on the pH signal. A visual of the components of the algae growth system can also be viewed from any location via the cell phone application to confirm that the system is running correctly. Consequently, we are able to maintain efficient productivity and maintain 24-hour control of the greenhouse algae growing ponds. This has greatly enhanced the availability of historical and real-time data to improve management of the Algae Growth System. It has demonstrated the concept of an affordable control system based on open source Arduino and cloud-based data communication. The system will be incorporated as part of the algae growth system technology package for the commercialization phase of the Algae to Energy project.

The project has resulted in two knowledge innovation outputs, a technology demonstrator and prototype monitoring and control system. The project was successfully completed in 2020 and has been closed.

InnoVenton Workshop

A practical introduction to IoT and user interface programming

Join us for two days practical introduction to the concept of The Internet of Things, and microcontrollers programming with cell phone applications

What the course will cover

- Understand and explain the concepts of IoT, microcontrollers and communication methods
- Programme an Arduino board
- Be able to communicate with their chosen application via a cell phone

Who should attend?

Individuals interested in learning about IoT for professional or personal use
No prior knowledge or experience of programming or electronics required

Course Requirements

Laptop with an internet connection and a Cellular phone

BOOK NOW AS SPACE IS LIMITED

For more information and bookings please contact:

Ms Patience Nyabasa

T +27 41 504 3281

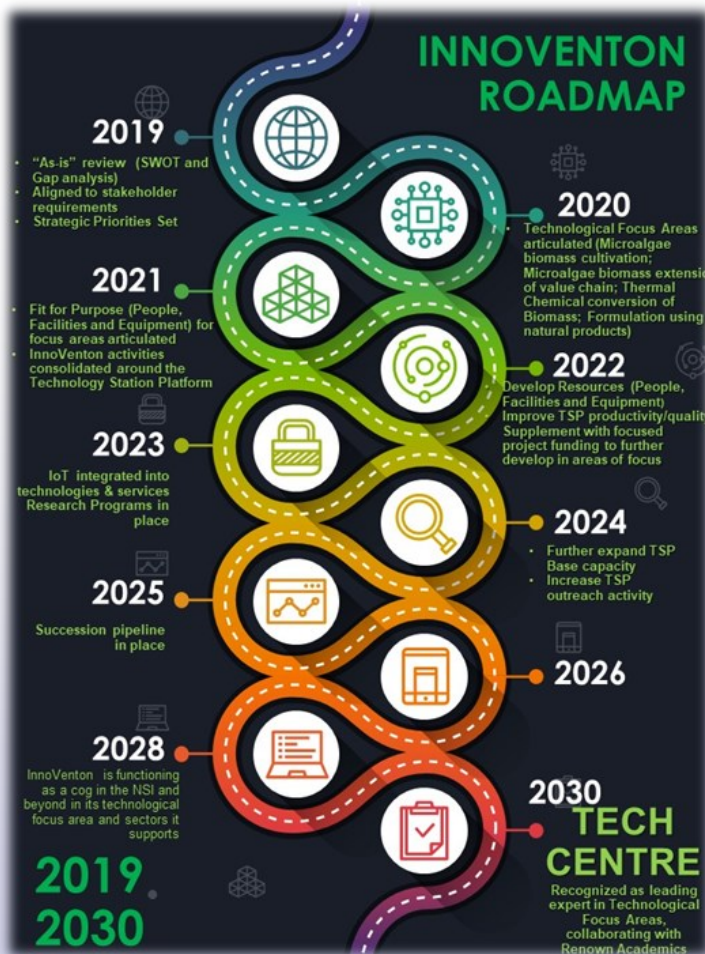
E Patience.Nyabasa@mandela.ac.za

INNOVENTONS STRATEGIC DIRECTION

Our role is to provide technology support services; skills development training and a technology development capability for basic research and client projects. This includes improving the alignment of basic research and formal teaching with needs. Our strategic Priorities are:

- To Capitalize on the experience of our staff
- Leverage our reputation and resources
- Promote our core activities
- Increase collaboration within the Faculty
- Align research with stakeholders requirements
- Build core technology capability at InnoVenton
- Ensure excellence and efficiency
- Increase customer focus
- Optimise the balance of activities (services vs technology development vs research)

What the future could hold...



InnoVenton

Dream. Innovate. Create.
Specialist Analytical Services

Gas Chromatography

- GCMS, (Fingerprinting comparison of volatile/semi-volatile organic compounds)
- SIMDIS, (Simulated Distillation of Fuels)
- GC x GC, (Separation of complex hydrocarbon mixtures)

Coal and Biomass Analysis

- ◆ Thermal Gravimetric Prox-Analysis (moisture, volatiles, ash, fixed carbon)
- Calorific Value

Spectroscopy

- ◆ ED-XRF, Fast Semi-quantitative elemental analysis.
- UV/Vis, Qualitative and Quantitative analysis
- FTIR, Raw material fingerprinting

Fuel Analysis

- ◆ Flash point, Density, Viscosity
- IR , FAMES, Cetane number
- Copper Strip, Iodine Value
- CFPP, Cloud Point, Oxidation Stability
- Vapour Pressure, Distillation Points
- Energy Value, Carbon Residue
- Methanol Content
- Sulfated Ash
- Total Contamination

Winning Teams...

- Play to win
- Take risks
- Keep improving
- Care about each other

MY ALONE
TIME IS
SOMETIMES
FOR YOUR
SAFETY..



DON'T FORGET THAT.

Looking forward - 2021

2021 promises to be another project packed year. The following are a few of the main activities planned :

Microalgae Technologies: The establishment of a Microalgae Technologies Research Centre at InnoVenton stems from success and deliverables met during the first 3 Years of this project. Support from the Department of Science and Innovation has enabled InnoVenton to expand the previous Microalgae to Energy Project into much larger Microalgae Technologies Research. Deliverables and focus areas for the next year will hone in on the development of energy and liquid fuels from microalgae.

Hand Sanitiser for Nelson Mandela University: With the onset of COVID-19 in March 2020, InnoVenton has formulated and manufactured an alcohol based Hand Sanitiser for use on campus. There may still be a demand for this capacity in 2021.

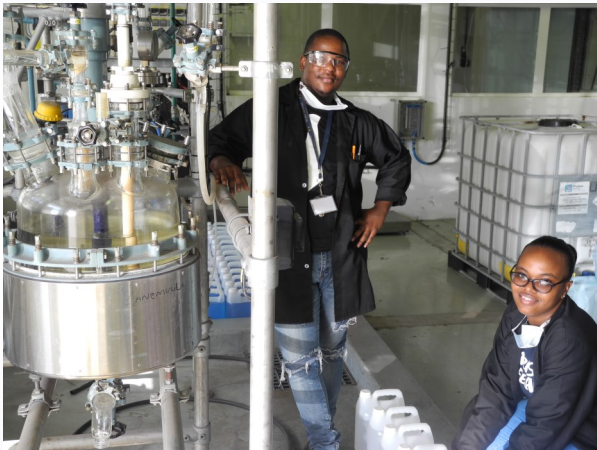


Photo: Sifundo Duma and Nolundi Maninjwa making Hand Sanitiser in the Kilo Lab.

TIA Seed Fund Projects:

Flameless Paraffin: The project proposes an alternative cooking stove to the open flame paraffin fuelled cooking devices known to cause domestic fires and health problems. It would be developed as a catalytic heater that operates with no flame. The feasibility of supported oxidation catalysts suitable for affordable flameless heating and cooking devices would be investigated.

Tsetse Fly Attract: Tsetse flies are disease carrying pests causing many deaths annually. They can be lured into poisonous traps with chemical attractants. This project proposes the development of a method to manufacture prophenol from clove oil. After laboratory synthesis is optimised we would propose a scaled up synthesis at our pilot plant for trials.

Phycocyanin: Refinement and optimisation of the laboratory-scale process we have developed on plant scale. We continue to develop a technology package for transfer to an entrepreneur or SME.

Client Projects:

Cosmetic Formulation Improvement: A client has requested assistance to improve on her formulation.

IoT Automation : A client has requested assistance with implementation and monitoring of a water system for a Bee farm.

DSI Industry and Environment: Biofertilizer formulation and Effluent growth algal biomass : The project proposes the development of a biofertilizer product and algal production demonstration using waste streams containing nutrients in an integrated process to provide the envisaged product.



SLP Process Safety

This course will provide a broad understanding of the tools and problem-solving techniques used in process safety.

The course covers different hazards found in the chemical industry, safe work permits, consequences of toxic vapours, fires and explosions the SHE considerations regarding these consequences, process design and operations, asset integrity, legal aspects, management of change and safety cultures. The format of the presentations will be on MS Teams, the first workshop starts in January 2021.

Who would benefit:

- Anyone involved with a role that does not have direct line responsibility for process safety
- Anyone who would like to develop a broad understanding of process safety

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NELSON MANDELA
UNIVERSITY

Looking forward - 2021

Soda Bread

Something to survive another year... You'll need:

480g Plain Flour

350 ml Buttermilk

1 teaspoon of

baking powder

A pinch of salt



Method:

Combine dry ingredients in a bowl. Make a hole in the centre of flour and slowly pour in the buttermilk. Knead slowly by hand until soft and crumbly. Do not over knead. Roll dough into a ball, place on a greased baking tray for 40 minutes in oven at 220°C.

InnoVenton

Technology and Specialized Development

InnoVenton/DCTS strives to provide specific technology support and innovation in the areas of:

Research

- Applied Chemistry in Product and Process Development

Teaching and Learning

- Formal qualifications and non-formal short courses.

Engagement and Services

- Technology Support
- Technology Demonstration
- Analytical and testing services
- Quality services

Our Laboratory is willing to assess and assist you with your testing and analysis requirements.

Celebrating 15 Years



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