“Homegrown Solutions in Vietnam: Bringing *C. Asiatica* Compounds Forwards As Candidates to Treat Liver Cancer”

Prof Michelle Garrett

Dr Sara Lopez-Gomollon

UV-CAP

GCRF Global Challenges Research Fund

UKRI Engineering and Physical Sciences Research Council

Stand for ambition. **kent.ac.uk**

VHH Institute of Chemistry

University of Kent

AMDI Asian Management and Development Institute

UCL

Global burden of primary liver cancer

905,700

people were **diagnosed** with liver cancer in 2020

830,200

people **died** from liver cancer in 2020

Liver cancer ranked among the **top 3** causes of **cancer death** in

46 countries

in 2020

The **number** of people **diagnosed** with or **dying** from liver cancer globally could

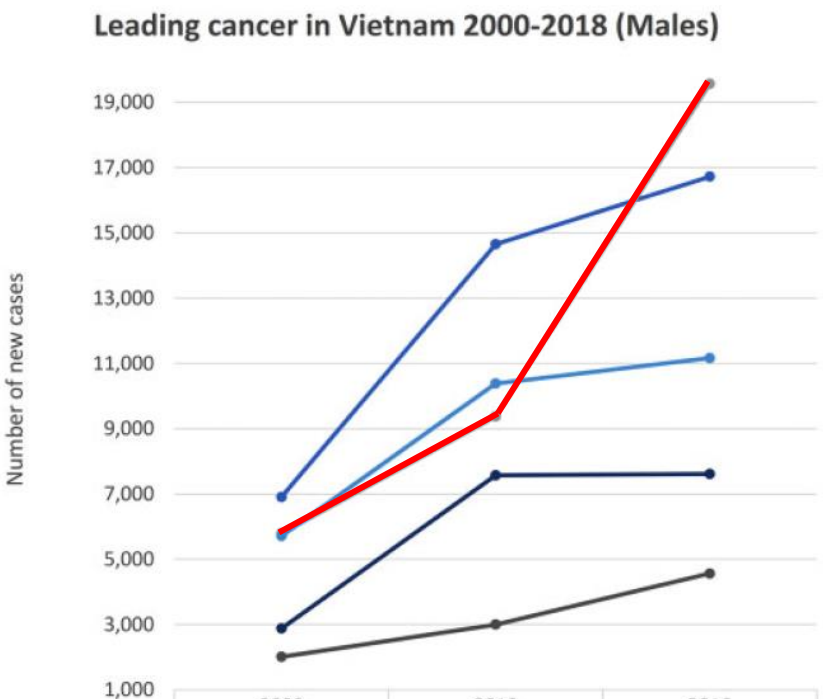
increase by more than 55%

between 2020 and 2040 if current rates do not change

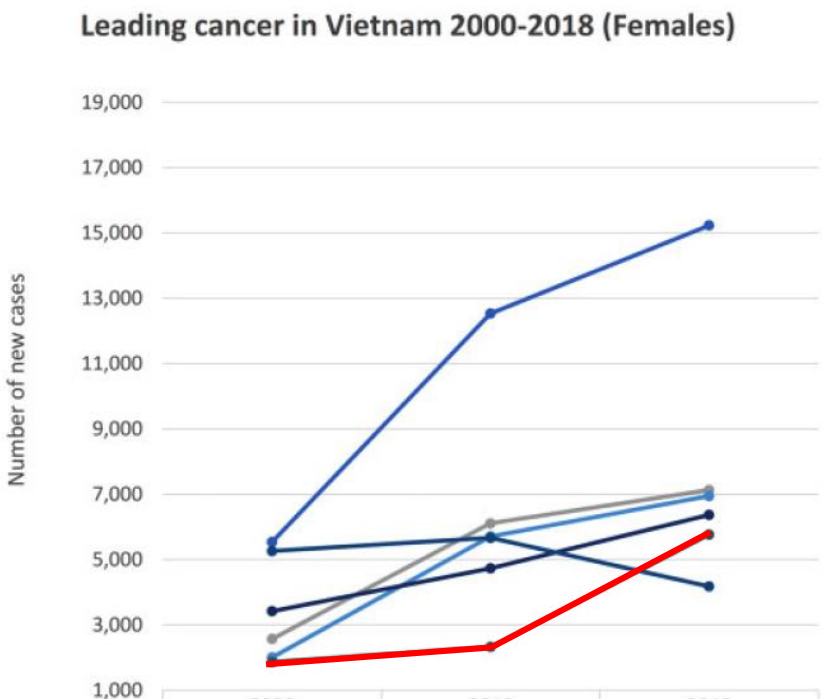
Liver cancer is a major cause of death in many countries. Efforts to reduce the incidence of preventable liver cancer should be prioritised to avoid the predicted rise in people diagnosed with liver cancer.

Rumgay et al, Journal of Hepatology,2022,

Liver cancer in Viet Nam: unique challenge



	2000	2010	2018
Lung	6,905	14,652	16,722
Liver	5,787	9,372	19,568
Stomach	5,711	10,384	11,161
Colorectum	2,878	7,568	7,607
Nasopharynx	2,006	2,992	4,559



	2000	2010	2018
Breast	5,538	12,533	15,229
Colorectum	2,566	6,110	7,126
Lung	2,001	5,709	6,945
Stomach	3,418	4,728	6,366
Liver	1,861	2,319	5,767
Cervix	5,260	5,664	4,177

Liver cancer is the most **prevalent** (14.5%) and **fatal** cancer (20.6%) in Viet Nam

25,000 deaths/year

Causes:

1. Hepatitis (+ vaccine hesitancy)
2. Alcohol
3. Pollution: agrochemicals and agent orange

Median survival time **10 months** due to *late presentation and diagnosis*

Costs put 37% of families of patients into poverty

Pham T, Bui L, Kim G, Hoang D, Tran T, Hoang M. **Cancer Control J Moffitt Cancer Cent.** 2019, 26, 1073274819863802
https://gco.iarc.fr/today/data/factsheets/populations/704-viet-nam-fact-sheets.pdf

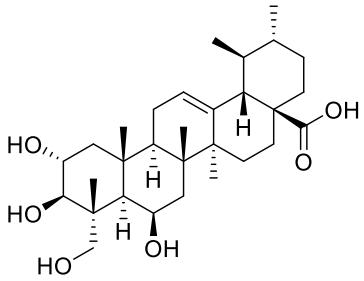
Centella Asiatica: antitumoral potential of madecassic acid

Centella Asiatica
(rau má, gotu kola, Asian pennywort)

- Popular medicinal and nutritional herb in southeast Asia
- Used for: High blood pressure, arthritis, wound healing, anti-ageing

Madecassic acid (MA): Natural product from C. asiatica

- Antiproliferative activity:
- Cell lines: liver, melanoma, lung, colon
- Mouse model: colon
- Chemical derivatives have improved potential



IC_{50} in HepG2 cells:

MA: 179 µM
Derivatives: 1.12 µM

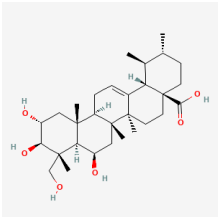
Project Aim:
Bring MA derivatives forward as potential new therapeutics against liver cancer, which could be produced within Vietnam

Van Loc T, Nhu VTQ, Van Chien T, Ha LTT, Thao TTP, Van Sung T. **Z Für Naturforschung B.** 2018, 73, 91–8.

UK Vietnam Centella Asiatica Project (UV-CAP)

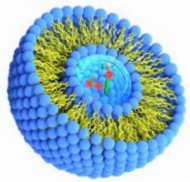
Optimisation of **growth conditions** for maximal madecassic acid production

Improvement of **chemical extraction** processes



Broadening the **range of chemical derivatives** from madecassic acid

Analysis using chemical biology of the **cellular effects** of madecassic acid



Exploration of use of polymers to control the rate of **release** in the body

We are an **international and interdisciplinary** team

Ms Be Thi Hoang Yen
Asian Management and Development Institute
Social science

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Vietnam Academy of Science and Technology
Institute of Chemistry
Natural products chemistry

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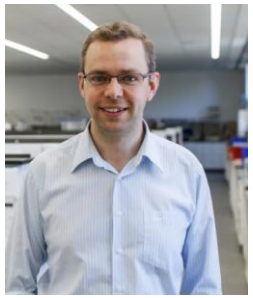
Vietnam Academy of Science and Technology
Institute of Chemistry
Extraction and analysis

Dr Tran Van Chien
Vietnam Academy of Science and Technology
Institute of Chemistry
Medicinal chemistry

Prof Do Thi Thao
Vietnam Academy of Science and Technology
Institute of Biotechnology
Biological testing

Prof. Hoang Thi Thai Hoa
Faculty of Agronomy
University of Hue
Plant nutrition

Dr Duong Thanh Thuy
Faculty of Agronomy
University of Hue
Plant Biotechnology



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Chemical biology

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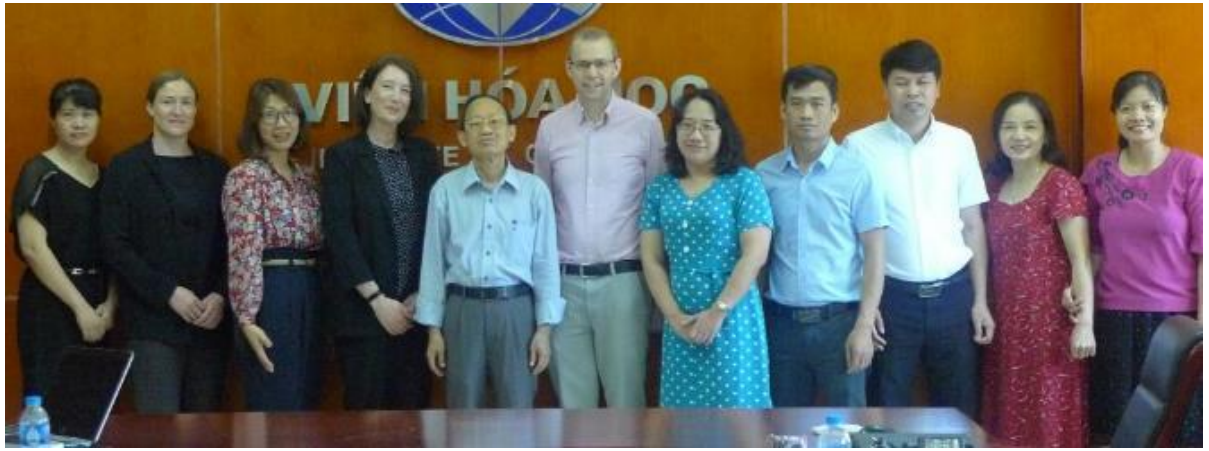
University of Kent
Centre for Health Services Studies
Social science

Dr Geraud Sansom
University of Kent
School of Chemistry and Forensic Science
Chemical biology

We created a **collaborative** network: from farmers…

We created a **collaborative** network: from farmers to clinicians



UK Vietnam Centella Asiatica Project (UV-CAP)

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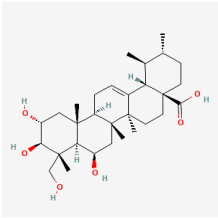

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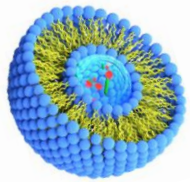


Exploration of use of polymers to control the rate of **release** in the body

University of Kent

1 year Postdoctoral Research Position in Plant Biotechnology

"**Crop resilience**: Genetic informed improvement of the medicinal plant *Centella asiatica,* towards climate resilient production of anticancer compounds in rural areas of Vietnam".

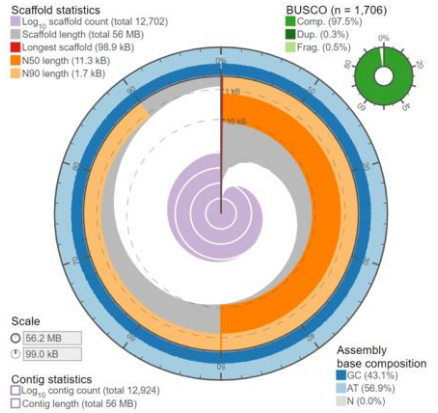
British Council Early Career Fellows International Science Partnerships Fund (kent.ac.uk)

Deadline 30th of June

Workpackages

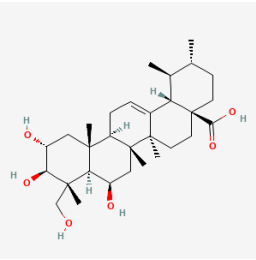
Germination and growth of *Centella asiatica* land races and seed stock genotypes (WP1)

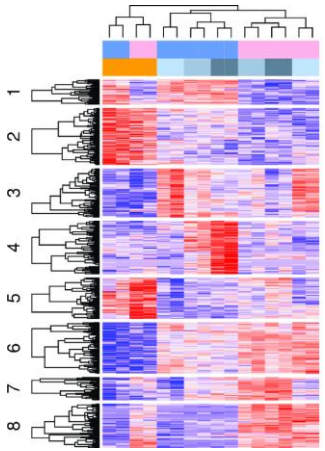
DArT genotype of landraces and computational analysis (WP1)



Development of biotechnological tools for *Centella asiatica* (WP2)

Spatiotemporal analysis of MA production and gene expression (WP1)





Induction of MA production (WP3)

What will you gain?

The successful candidate will:

- ✓ Develop **new skills** and techniques relevant to the selected research area through advanced training within and outside the University of Kent.
- ✓ Conduct **independent research** within the designated area, under the supervision of two academic supervisors.
- ✓ Seek opportunities to **apply research findings** by engaging with relevant stakeholders.
- ✓ **Disseminate** research findings through publication in peer-reviewed academic journals, conference presentations, seminars, and media.
- ✓ Access to **mentors** to facilitate career launch upon return to Vietnam
- ✓ **Cascade the knowledge** and practical experience gained in the UK in Vietnam at the end of the fellowship
- ✓ **Honorary Academic status** upon leaving the University of Kent.

What are we looking for?

Person specification (not exhaustive):

- PhD obtained or close to completion in Biology or related discipline
- Knowledge of plant biology and genetics.
- Knowledge of laboratory-based molecular biology techniques
- Experience of working with plants.
- Strong analytical and problem-solving skills.
- Good IT skills.
- Excellent communication and interpersonal skills.
- Proven time management skills and ability to meet deadlines.
- Ability to work both independently and collaboratively in a multicultural environment.

Engaged with the project and ready to make a difference!

Thank you

Prof Michelle Garrett
University of Kent
School of Biosciences
Cancer biology

Dr Sara Lopez-Gomollon
University of Kent
School of Biosciences
Plant Biology

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