PUBLIC REPORT

LEARNINGin2019

ARTISTS IN RESIDENCE

Jill Scott, Marile Hahne 2019

ArtScience Node Berlin

In 2019, Jill Scott and Marille Hahne visited CHIC research labs and partners: in New Zealand, in Finland, Espoo (VTT), in Holland, Wageningen (Keygene and Wageningen University and Research) and in Roosendaal (Sensus). What follows is a short report from these visits.

This project has received funding from the EU Horizon 2020 research & innovation programme under grant agreement N. 760891.

REPORT

The purpose of our visits in 2019 to five labs of the CHIC consortium was to search for information to inspire AFTERTASTE. These residencies were organized by the Art Science Node in Berlin.

AFTERTASTE is our art and science project that aims to stimulate reflection for more public audiences. The project is based on the health of the human olfaction and gustatory systems and the feedback between these systems and the content is based on the primary and secondary compounds found in the chicory root.

AFTERTASTE has 2 parts that aim to explore two communicative potentials:

1. Interactive Sculpture

The first aim is to create a haptic media art work that is based on the molecules that cause flavor. Chicory is used as the case study. It will consist of three scaled up abstract models from the human olfactory and gustatory systems. The tongue, the molecules and the olfactory bulb are in the process of being prototyped including 3 D printing, material tests and concepts for visitor-interaction. Further information can be found on www.jillscott.org/news

2. The Video

The second aim is to produce a documentary video called Chicory Unpacked that follows some of the research and the residency experiences over the course of time. In 2019, we interviewed 20 scientists on film about their research and their research processes. We are now transcribing all interviews and will find a key thread of argumentation and relational content. In 2020, we will continue to film very specific interviews with questions focusing on the outcomes of the CHIC research.

LIST OF VISITS TO CHIC PARTNERS

1.
DATE: 7th and 8th March 2019
The New Zealand Institute for Plant & Food Research Limited , Auckland, New Zealand
2.
DATE: 18-30 August 2019
Industrial Biotechnology and Food Solutions, VTT Technical Research Centre of Finland Ltd.Espoo, Finland
3.
DATE: 20-21 September 2019
Wageningen University and Research WUR, the Netherlands
4.
DATE: 23-25 September2019
KEYGENE Wageningen, the Netherlands
5.
DATE 26th-29th September 2019.
SENSUS Roosendaal, the Netherlands

RESULTS/PLANS:

The main labs of focus in 2019 were VTT, the lab of Wageningen University and Research and Keygene. The plan is to bring all the information together in 2020 and build all the components for the sculpture. The video will be finished in 2021 after more interviews and postproduction.

In 2020, we are planing the following visits in order to find out specific details for AFTERTASTE.

1.
3 weeks in June 2020 in Wageningen- in relation to the collection of visual and sound information for the Aftertaste scripts of the CHIC research there.
Interviews last week of June.
2.
2 weeks in October 2020 in VTT- in relation to outcomes of the CHIC research there.
Interviews last week of October
3.
Date to be arranged: 1 week in Amsterdam with Sensus

1. PLANT & FOOD RESEARCH PFR, AUCKLAND

Location: The New Zealand Institute for Plant & Food Research Limited , Auckland
Contact: Dr. Andrew Allen
Date: 7th and 8th March 2019

Learning:
Here we learnt about New Cultivar Innovation. Of particular interest were their successful developments in Kiwiberries and red apples Further research is not necessary in the context of our AFTERTASTE projects but it was an informative introduction for us about the potentials of crop innovation and their past results.

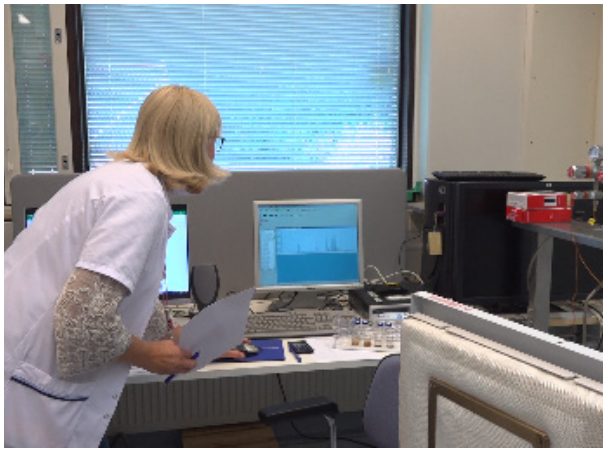
Keywords and Photos:
Breeding, Genomics, Bioprotection, Sustainable Production, Food Innovation, Field Research

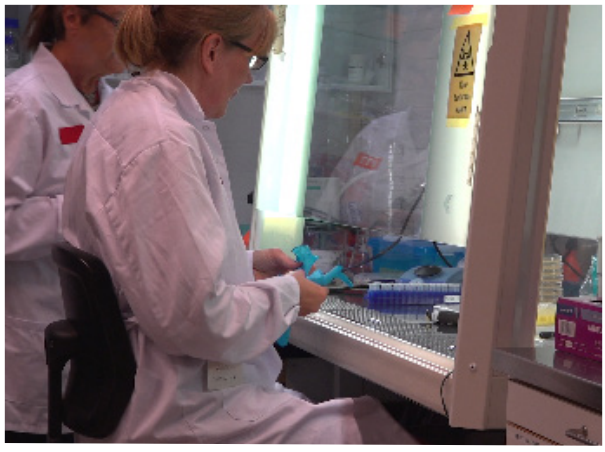
2. VTT ESPOO HELSINKI, FINLAND

Location: VTT Technical Research Centre of Finland Ltd in Espoo Industrial Biotechnology
Contact: Dr. Suvi T. Häkkinen
DATE: 18th -30th August.

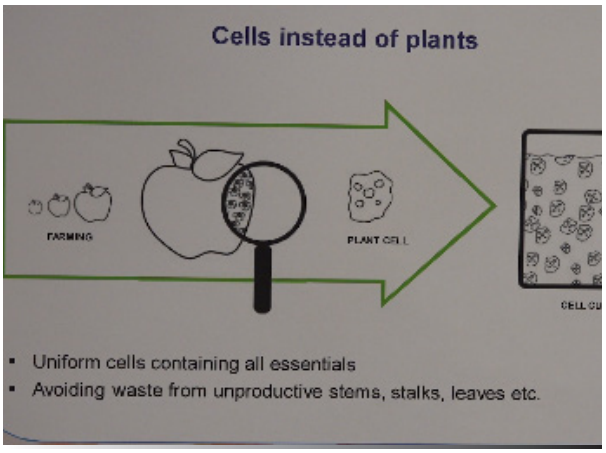
Learning:
Here we learnt about vitamins, carbohydrates, fibere and the aims to produce nutrient rich cell cultures as food. We shadowed Suvi Häkkinen in the lab on Arctic Bramble (Rubus articus). We learnt how growth regulators can be added, how primary compounds are necessary for survival and how secondary compounds are often produced in stress from reactions to the plants surrounding environments. For example Birch cell cultures produce red pigment under stress. In this lab modified cells are always compared to untreated or unmodified cells. Dry weight is only one type of analysis, that measures the biomass. However, chemical analyses will be needed to determine the amounts specific compounds in the samples from chicory.
The main work on the CHIC project for us will be to learn more about the potentials of the many terpenes from chicory for its bio-activity potentials and we will return in 2020 for the assessment of the plant from KeyGene and more interviews.

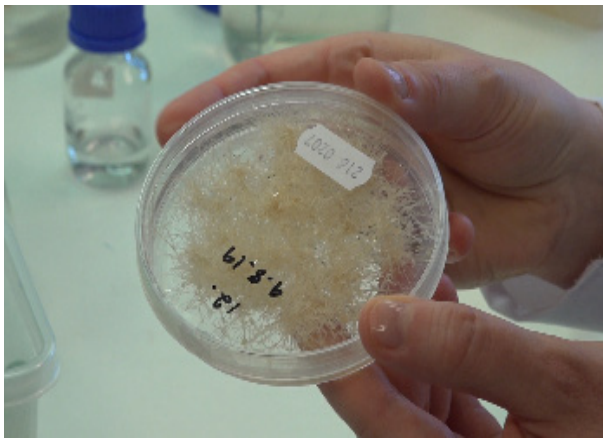
VTT Technical Research Centre of Finland Ltd in Espoo
Keywords and Photos
How valuable compounds are produced in cell cultures, the primary and secondary compounds in chicory, potential bioactivity tests for terpenes, plant cell cultures and cell factory concepts for food, nutrician and antimicrobial and antitoxidative assessments. Keywords: sequencing and chromatography, sourcing and biodiversity, pro-biotics, abiotics and biotics, phenolics, tannins, terpenoids, measuring sensory characteristics, re-inventing the food chain, personalized dietary services. Biofilm management, gas formation and colon models

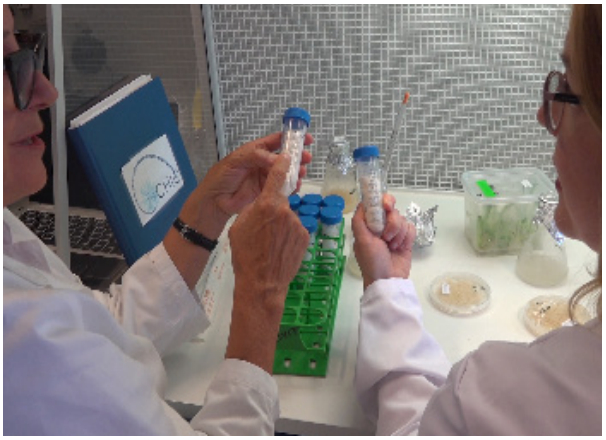


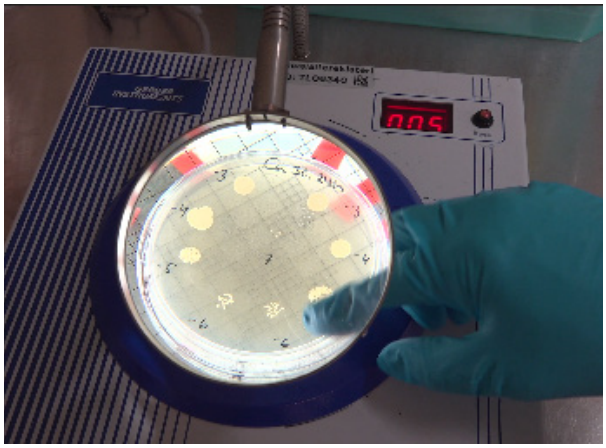


VTT Technical Research Centre
of Finland Ltd in Espoo









3. WAGENINGEN UNIVERSITY AND RESEARCH

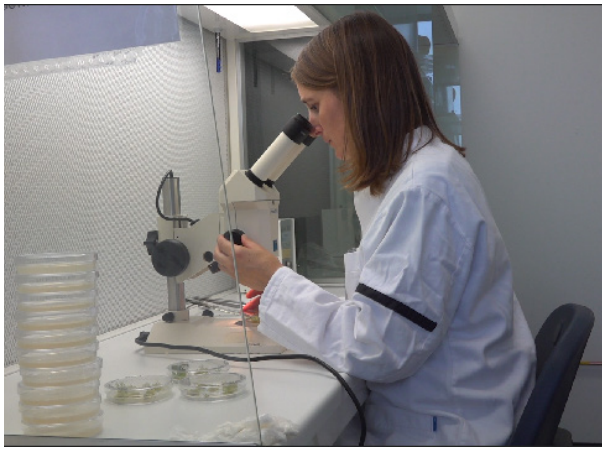
Location: WUR Wageningen Plant Research, The Netherlands
Contact: Dirk Bosch
Date: 23rd and 24th September

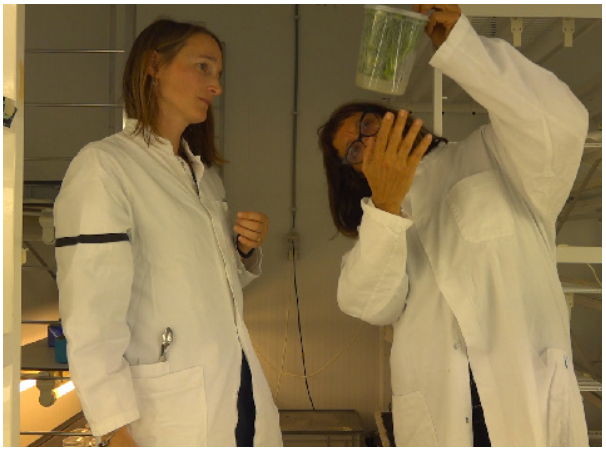
Learning:

Here we learnt about chicory from the laboratory and the greenhouse. We shadowed some of the scientists. We attempted to understanding plant-environment interactions and quality traits, including the class-2 systems (e.g. Cas9 and Cpf1) E. coli systems and CRISPR-Cas systems methods. Dirk, Katja and Thamara gave us an Introduction to CHIC terpenes and their bio synthesis and the sequencing of the plant genome. Ingrid, Hanny, Dirk told us about gene editing procedures; from guide design, to greenhouse. Their Focus is on inulin (including analytics, taste, etc.) Ruud told us about gene editing in tomatoes. morphology of phenotypes and protoplast transfection (with GFP)
We will return for more specific analysis, interviews and stimulation for our production in 2020.

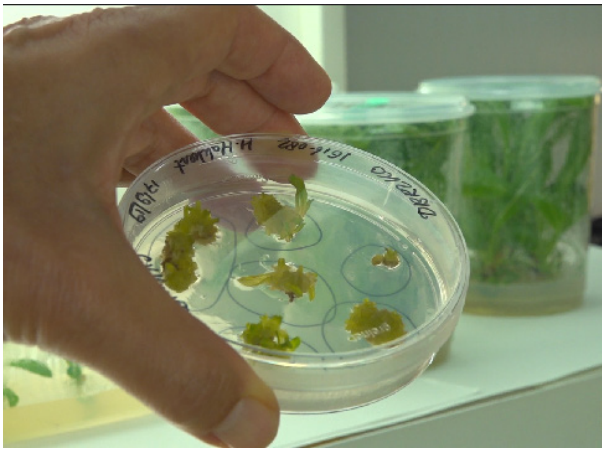
Keywords and photos

Food fibers and bioactive terpenes, sequencing machines, different processes, genome maps of chicory, long verses short reads, knocking out enzymes improve the chains, developments like nose on a chip, activities of ßoligosaccharides, inulin as a pre-biotic, food source, improvement for gut bacteria, mutating one of the bio-synthesis enzymes, increase the yields, block the terpenes, CRISPR-Cas9 and gene editing approaches.



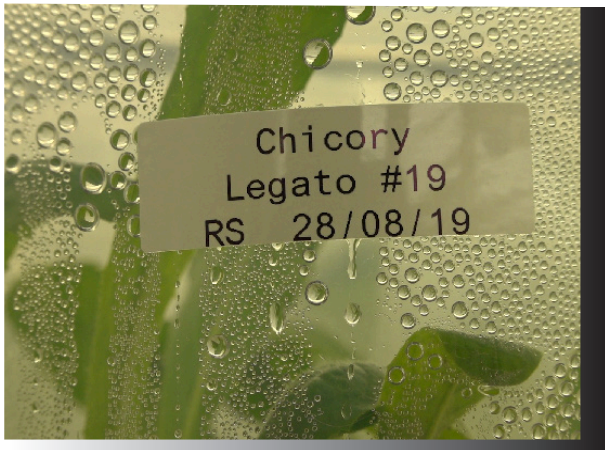


WUR Wageningen Plant Research,
The Netherlands



4. KEYGENE WAGENINGEN

Location: KeyGene in Wageningen, the Netherlands
Contact: Erik Toussaint
DATE: 27-30 September

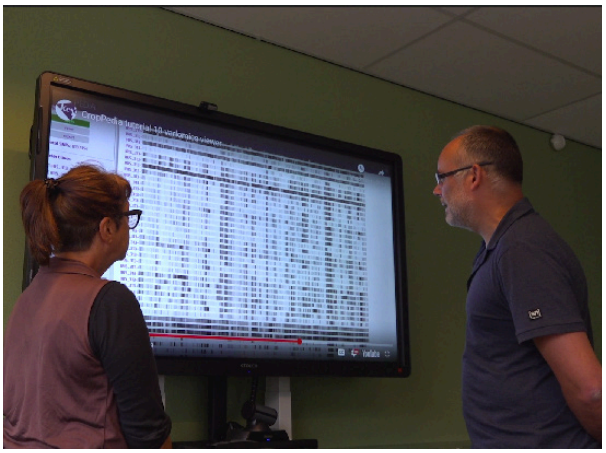


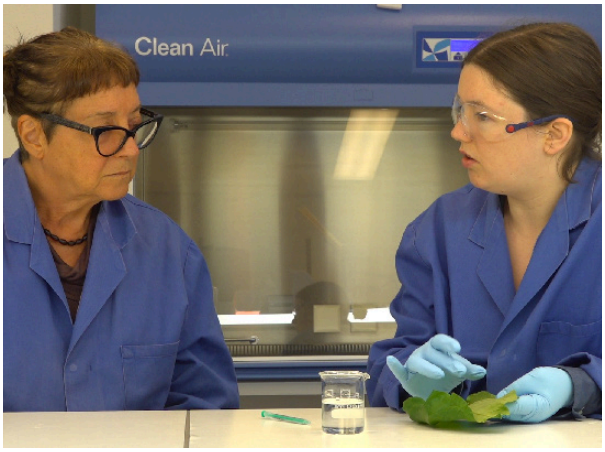
Learning:
We started by meeting at Keygene with the CEO Arjen J. van Tunen. We wanted to understand how breeding works, as well as gain some insight into digital phenotyping, genome sequencing, portable sequencing and editing and non-transgenic methods of NBPTs for trait improvements. We also were introduced to some new virtual reality breeding tools. We will return for a more extensive analysis and interviews in 2020.

Photos and Keywords:

Gene modification and detectability, new sequencing technologies, discoveries from knockout, comparing RNA messaging, measuring terpenes, breeders and growers and seeds, emasculation, digital phenotyping, calculating biotic stresses, accurate readouts from sequencing and traits, the plants immunity, hybrid breeding or loss of susceptibility, pathogen research, resilience to fungi.

KeyGene in Wageningen,
the Netherlands





5. SENSUS ROOSENDAAL

Location: SENSUS, Roosendaal
www.sensus.nl
Contact: Matthew de Roode
Date: 26th-29th of September

Learning:

Here we learnt how chicory is harvested, how chicory roots are processed in a factory setting and how inulin powders are produced. Harvesting chicory, delivering chicory roots to their factory and the manufacturing of inulin powders and oligofructose for the food industry.

Keywords of Photos:
Role and process: From seeds to growers, cultivation, harvest, extraction and packaging of inulin, transport and storage.

Health Benefits: Improved gut health, cardiovascular health, lower blood glucose rise, less calories, weight management, sugar reduction.

CONTACT:

Prof. Dr. Jill Scott
Hardturmstr 132 a
8005 Zurich, Switzerland
0041 (0) 795249211
jscott@solnet.ch

ARTISTS:

www.jillscott.org

Dr. Jill Scott is Professor em. for Art and Science at the University of the Arts (ZHDK) in Zurich, Switzerland. She has been exhibiting her artworks since 1975, in USA, Australia and Europe. Since 2000, her focus has been on Neuroscience, Ecology and Art research.

www.marillehahne.com

Co-Artist: **Marille Hahne** is a Professor for Filmmaking at the Universitz of the Arts (ZHDK) in Zurich, Switzerland and Documentary Filmmaker

CONSULTANTS:

CHIC Consortium 2020 Horizon Project
Life Science Zurich University
Institute for Molecular Life Science Uni ZH

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CHIC Consortium. 2020 Horizon Project.
and Art Science Node, Berlin

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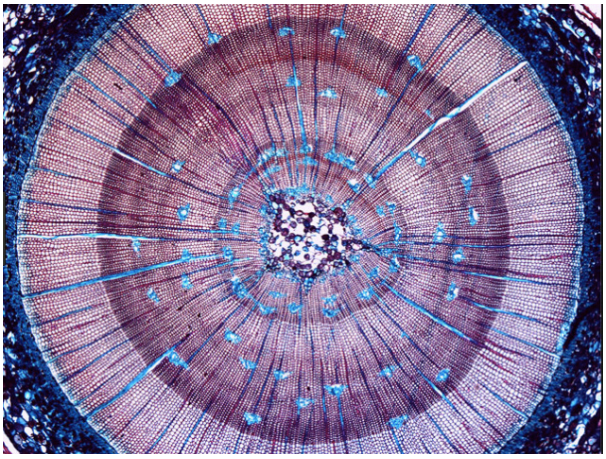
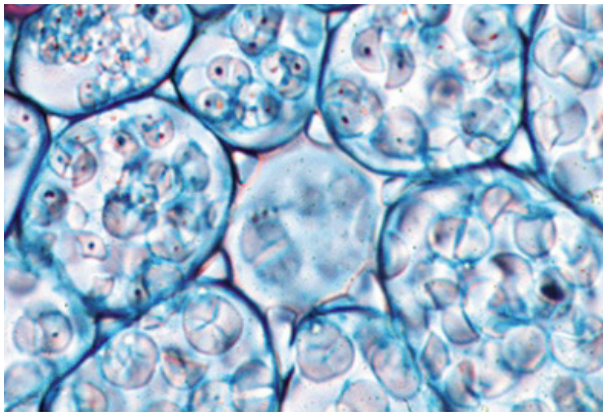
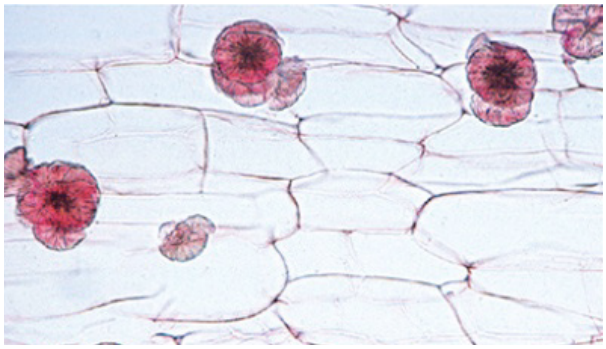
MOLECULAR IMAGES FOR AFTERTASTE



AFTERTASTE aesthetic inspirations:
Dendrochronology of the chicory root structure



AFTERTASTE aesthetic inspirations:
Inulin: light microscopy



AFTERTASTE aesthetic inspirations:
Inulin crystals: histology