UNIVERSITY OF ALBERTA

IMAGES OF RESEARCH

COLOURING BOOK

The Images of Research Colouring Book

By Master's and Doctoral students of the University of Alberta submitted to the Images of Research Competition and Exhibition 2015 to 2019
uab.ca/ior

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You can find digital versions of the colouring book pages online (uab.ca/ior)

Colouring Book Design by: Reyhaneh Alizadeh Rabiei (Rianna), MDes

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ABOUT THIS **BOOK**

This book is a collection of images submitted by Master's and Doctoral researchers challenged to convey their research in one single image. The selected images were either finalists or semi-finalists of the competition between 2015 and 2019.

We created this colouring book to celebrate the fifth anniversary of Images of Research competition and exhibition.

[redacted]

RESEARCH PROJECTS

How to use this colouring book:

- Colour, relax, play, and use your imagination!
- Enjoy this book with friends and family!
- Rip out the pages and show off your creation
- Discover the research and information about the student on the back of each colouring page

01

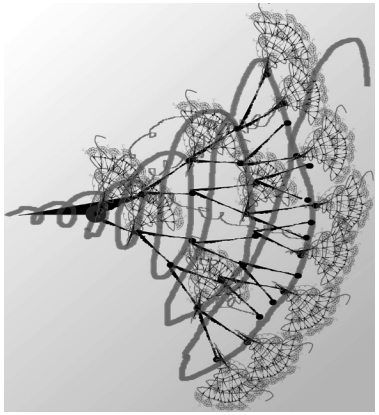
Abundant Recursive Mathematics Curricula Possibilities

Luo, Lixin

01

Abundant Recursive Mathematics Curricula Possibilities

Author(s) / Creator(s): Luo, Lixin

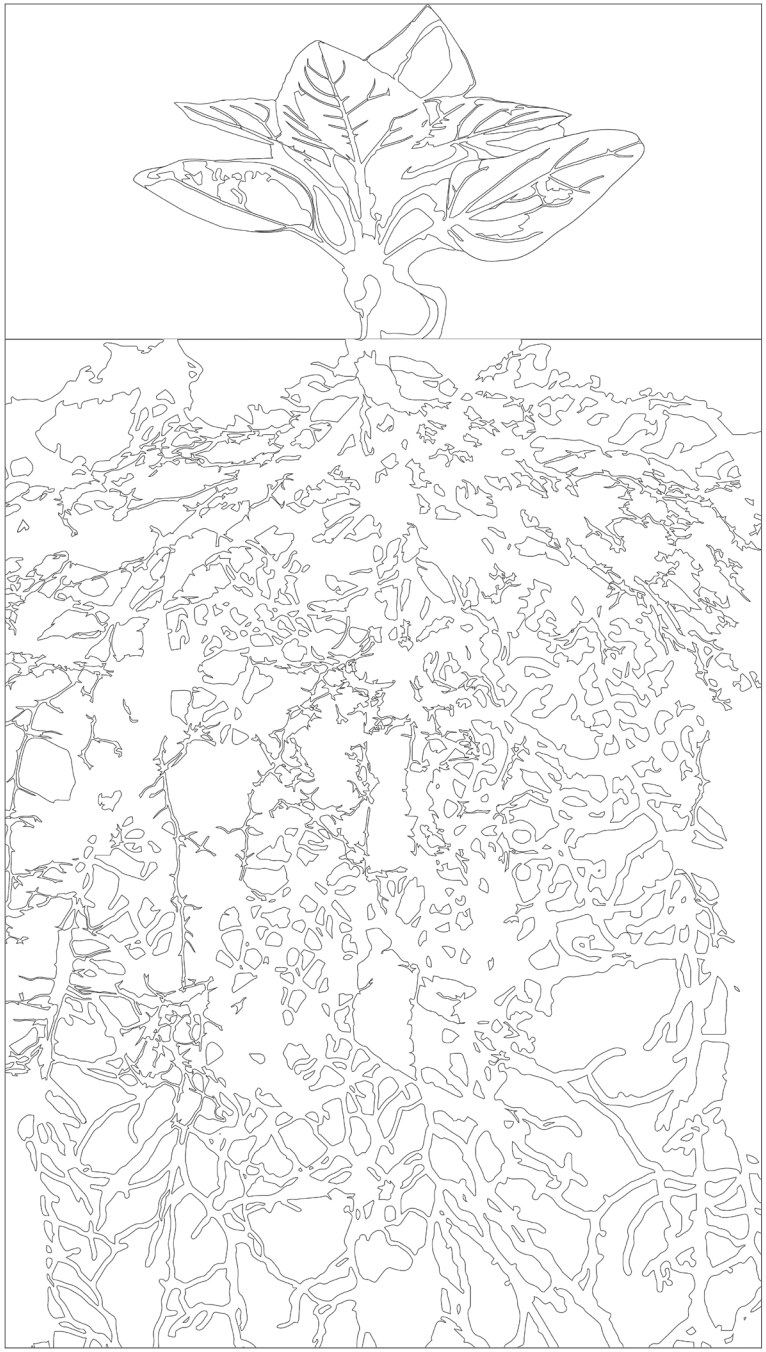


A mathematics curriculum often seems to be designed or delivered as linear: a sequence of predetermined, sometimes unrelated, topics with little chances for learners to revisit them from different perspectives. This suggests learning as accumulation with predictable outcomes. However, learning, observed through a complexfied worldview, is neither linear nor predictable. Learning is a self-organizing process through which a learner and her environment co-evolve, and a recursive elaboration through which a learner transforms her previous understanding. This view demands a recursive curriculum that changes along its formation. What might such curriculum be like in theory and practice is my research focus. This fractal-like image is a working visualization of recursive curricula. The nodes represent equivalent contents. Each branch represents certain mathematical/curricular event(s) that allow a content to change into or connect to another. The infinite spiral is made of loops that represent different development stages of an entry content (highlighted in green) and are ordered by the level of abstraction. The nodes on the same loop are different forms of the same content. Any node can be an entry point for many recursive curricula in the same or different dimension. This image represents abundant curriculum possibilities rather than a fixed one.

Program of study: PhD
Faculty/Department: Secondary Education
Place of creation: Edmonton, AB
Award: First Prize, Images of Research Competition 2019

Roots and Shoot

Bao, Tan



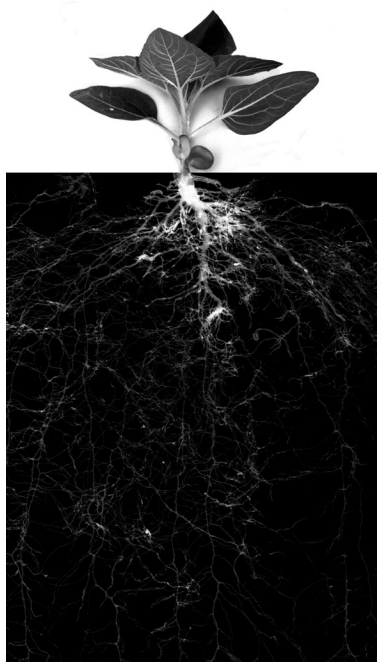
02

02

Roots and Shoot

Author(s) / Creator(s): Bao, Tan

This image is a composite image of two photos of the same sunflower (Helianthus annuus) plant. The aboveground green shoot was taken with a Nikon D90 SLR, and on the same day the belowground root was scanned using an Epson 550 Scanner after removing the soil by excavation. By stitching together the root and shoot image, we are able to see the hidden complexity of this little plant that is buried in the soil. Roots are important for plants for acquiring water and nutrients and keeping the plant upright, but are hard to study in nature because they are always obscured by soil. Our research has focused on developing a protocol to apply Digital Image Correlation (DIC) methods to visualizing and characterizing these hidden plant roots. We are now using these new protocols to understand how plants make decisions in where to place roots given choices of nutrient rich and poor patches under stressful conditions.

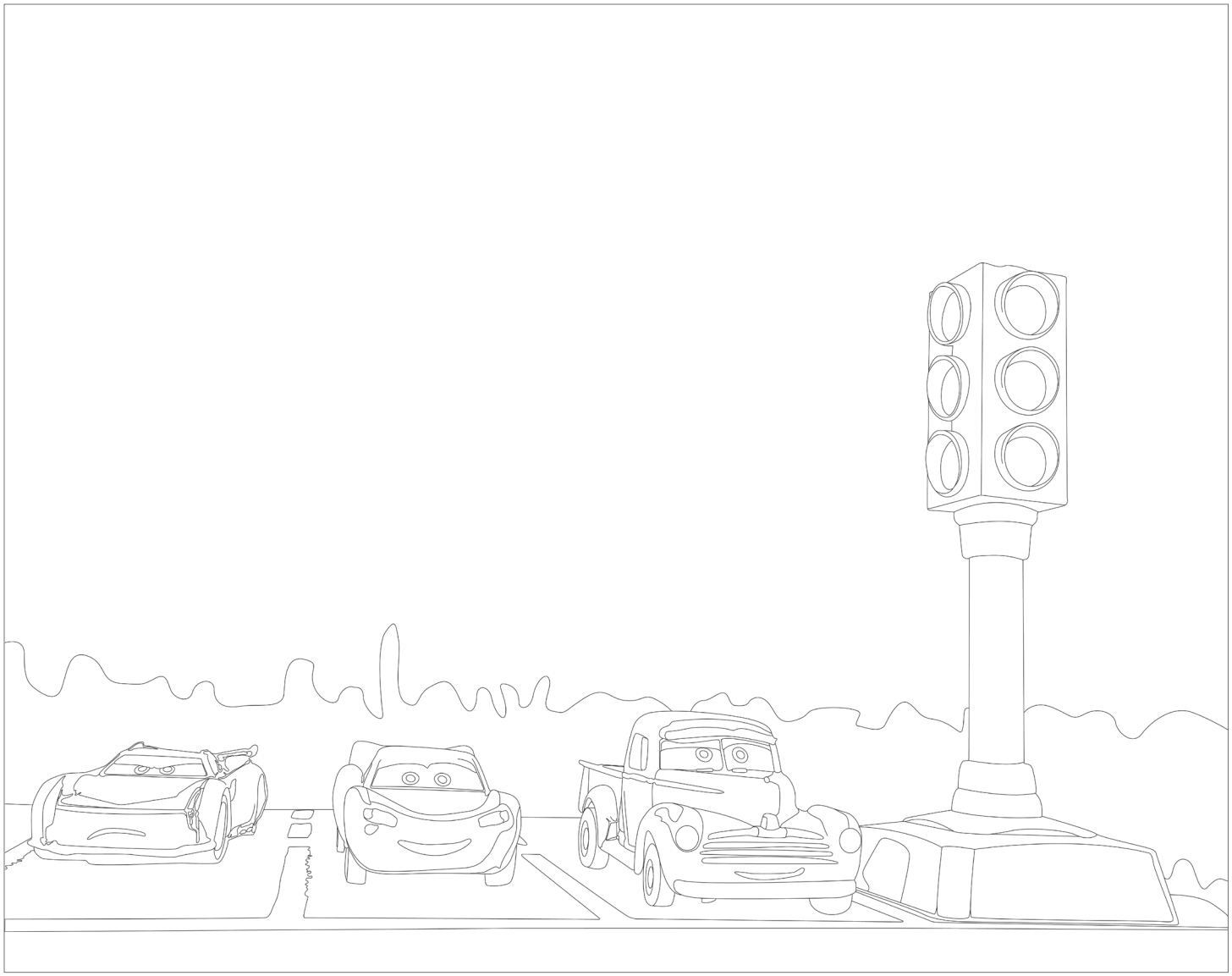


Program of study: PhD
Faculty/Department: Biological Sciences
Place of creation: Growth chambers, 5th floor Biological Sciences Building, University of Alberta

03

Cars with Personality: Shaping the Future with Connected Vehicle Technology

Seraj, Mudasser



03

Cars with Personality: Shaping the Future with Connected Vehicle Technology

Author(s) / Creator(s): Seraj, Mudasser

More than 1.25 million deaths are caused by traffic accidents every year, 95% of those are due to human error. To address and resolve this problem we are taking the help of an innovative concept, Connected Vehicle (CV). A connected car can assist the human driver by communicating with its surroundings and cooperating with other connected cars to enhance driver's safety and comfort. Three fundamental components of this emerging technology, Connection, Communication, and Cooperation, will allow the future car to build a personality representing the human driver. This image portrays the individuality dispersing from connected cars while they are united by common goals of enhancing traffic safety, efficiency and productivity on a global scale. My research aims to determine the extent of potential benefits expected from this promising technology. Since CV-technology is currently in its earlier days of evolution, the outcome of this research will be instrumental for policymakers in resource allocation and investment decision-making to shape the future of our transportation system.

Program of study: PhD
Faculty/Department: Civil & Environmental Engineering
Place of creation: University of Alberta
Award: Semi-Finalist, Images of Research Competition 2019

04

Changing the World, One Toy at a Time

Maruyama, Michiko

04

Changing the World, One Toy at a Time

Author(s) / Creator(s): Maruyama, Michiko

Drawing on my unique combination of industrial design, graphic art, and medical training, I aim to create educational resources that facilitate knowledge transfer and communication between physician and child. Since children learn through play, I was inspired to dedicate my Master of Industrial Design Thesis Work to the creation of education toys. Under the supervision of Robert Lederer, an experienced designer and associate professor at the University of Alberta, I am creating a series of educational toys that will teach children about cardiac health. These educational toys will teach basic cardiac anatomy, introduce medical terminology, discuss the importance of cardiac health and encourage a cardiac healthy lifestyle. By introducing the importance of cardiac health at an early age, the potential beneficial long term outcome is a decrease in the incidence of cardiac disease among the adult population. This image represents both my industrial design graduate studies research and my cardiac surgery residency training. The combination of graduate studies and medical residency is key to my research of integrating art, design and medicine. In this image, I combined my recent acrylic painting, Susie the Surgeon, (inspired by the “We Can Do It!” poster) with sketches of my educational toy design projects.

Program of study: Master’s
Faculty/Department: Art & Design, Industrial Design
Place of creation: Edmonton, AB
Award: Semi-finalist Prize, Images of Research Competition 2017

05

Augmented Phobia

Chakravorty, Anna

05

Augmented Phobia

Author(s) / Creator(s): Chakravorty, Anna

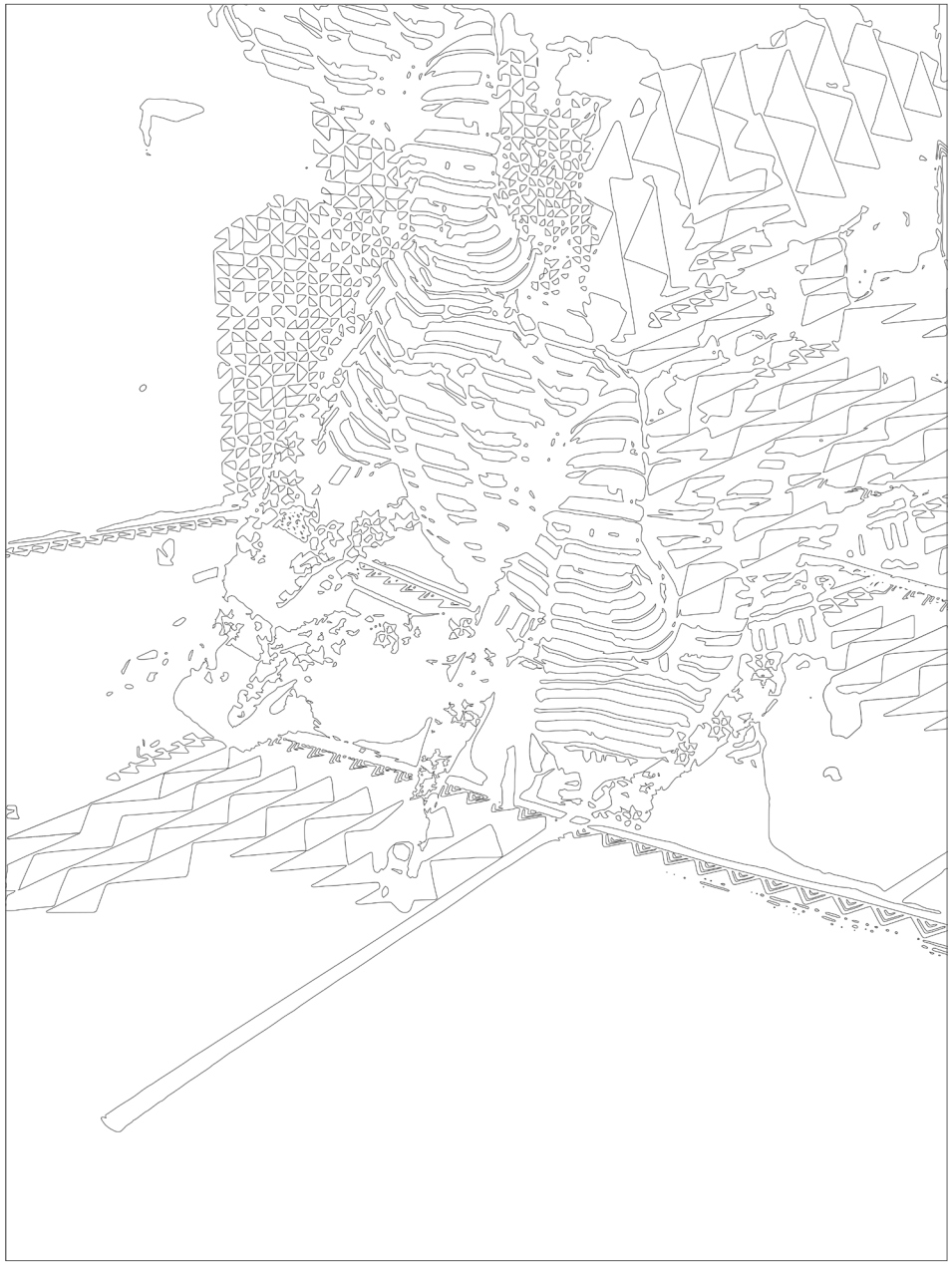
Most people who suffer phobias (around 60–80%) never seek treatment and of those who do seek treatment, approximately 25% either refuse exposure therapy when they hear what it entails or drops out of therapy. One of the reasons for this refusal data could be that the main feature of exposure is confronting the feared stimuli, which some people may find too frightening. New efforts are needed to increase the number of phobia sufferers who benefit from exposure therapy. Augmented reality systems give users a feeling of presence and reality judgment that can be exploited to treat some psychological disorders. My master's research focuses on understanding the human interaction with the technology and to determine if augmented reality can help people to overcome their phobias. To answer this, a series of testing would involve where the stimuli would render from basic shapes and forms to more real objects to a stage where the patient would be able to hold and interact with the stimuli. This would help people to expose themselves to their fears as well as act as a self-therapy.

Program of study: Master's
Faculty/Department: Art & Design, Visual Communication Design
Place of creation: University of Alberta
Award: First Prize, Images of Research Competition 2018

06

Absorption Experience

McCollum, Kim



06

Absorption Experience

Author(s) / Creator(s): McCollum, Kim

My research explores the relationship between textile work and abstract painting. This image is a digital collage that combines several photos of me learning to block print in India. These photos are mixed with digital paint and pattern to create an image that expresses the feeling of flow created when making something by hand. I wanted to visually capture the feeling of being so completely engrossed in the process of creating something that the creation and the creator become one. Making digital collages like this is the first step in my creative process. I combine digital painting with images of textile art to make connections between the two mediums and generate new ideas. My next step involves creating large-scale physical artworks inspired by my digital collages. This involves using painted and hand-woven components to create woven paintings. Referencing the visual histories of both 'high' and 'low' art has potential to create new connections and break down barriers that limit the influence of certain work based on medium.

Program of study: Master's
Faculty/Department: Art & Design
Place of creation: Edmonton, Alberta
Award: Second Prize, Images of Research Competition, 2018

07

Beneath the Flesh
Marino, Angela

07

Beneath the Flesh

Author(s) / Creator(s): Marino, Angela

The motivation behind my research is my mother's Multiple Sclerosis; she has had this disease since 2009 which has affected her mental and physical state of being. Living with a person who has MS changes the way you perceive what it means to be present. They are never again perceived as they once lived, but are rather fragments of who they were. Through my second hand experience of the disease, my research attempts to understand how she perceives mortality. The sublime experience of working in a meat deli and physically engaging with raw animal flesh, allowed me to make the connection to my mother's ambivalence towards life. My subjective approach to understanding her condition and my personal relationship with her is represented through the meat cooler. The meat cooler represents my existential understanding of being, and the possibility of becoming fragments of ourselves. Meat becomes a contemplation of ones flesh, it reveals how vulnerable we are and where we truly fit within our identity. Beneath the Flesh depicts my abstracted understanding of my mother's identity and her perception of living with this disease.

Program of study: Master's
Faculty/Department: Art & Design
Place of creation: University of Alberta
Award: Second Prize, Images of Research Competition, 2016

08

Meiosis

Girodat, Jamie-Lee

08

Meiosis

Author(s) / Creator(s): Girodat, Jamie-Lee

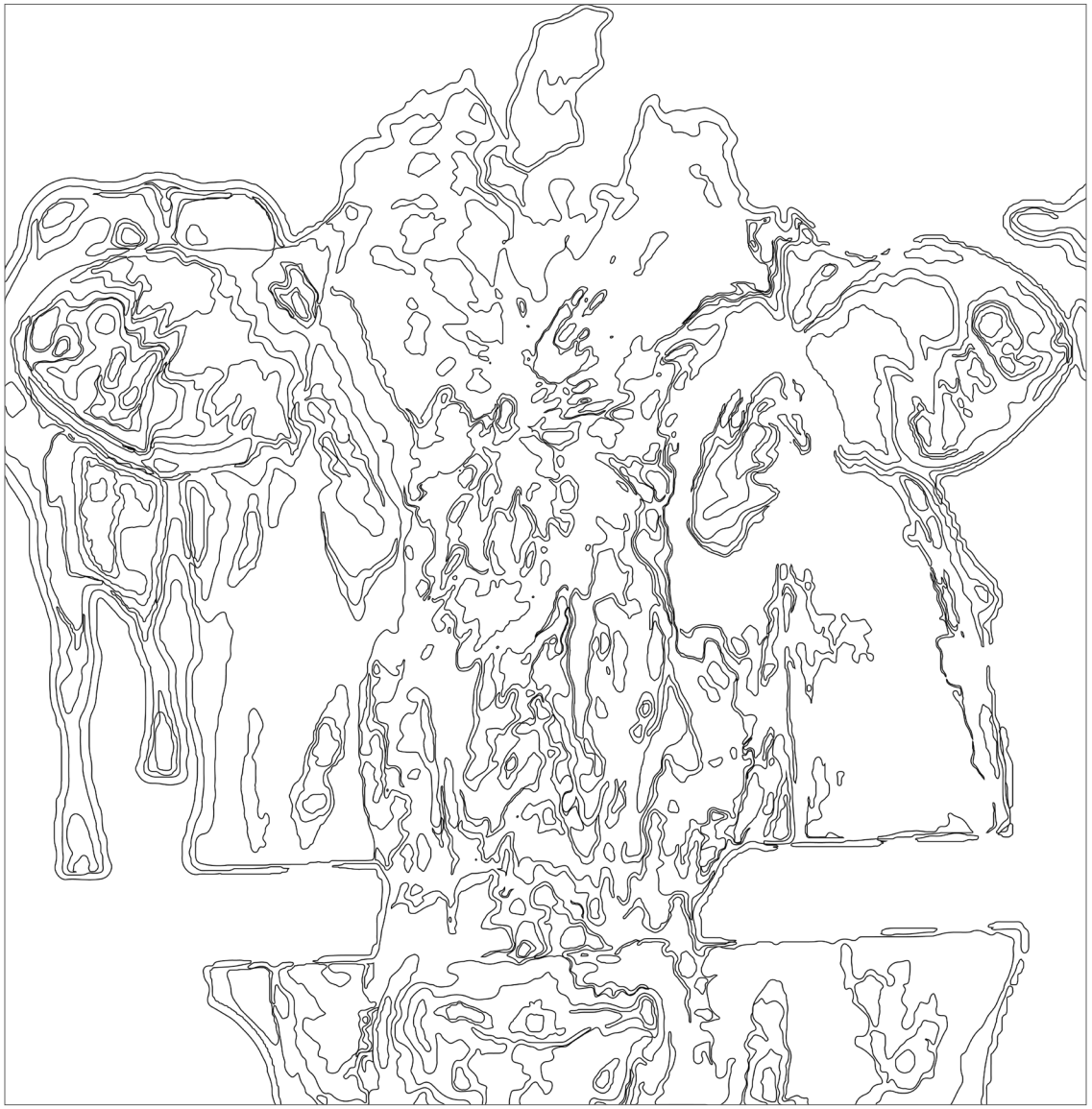
My practiced-based research in print media and animation focuses on navigating the uncertainties within female autonomy, family genetics, and dialogues with the self in relation to advancing reproductive technologies. With the developments of in vitro fertilization, embryo selection, and genetic editing, a question of if, when, and how to have children can be both liberating and constraining. Experiences of close family members of childbirth, raising children, working, being married, and going through menopause contrast and compliment my reality as a young millennial. The use of contemporary technologies can aid some concerns and limitations but may lead to the notion of taking part in a "participatory evolution". Choosing to use genetic engineering has benefits, including the potential to prevent disease and prolong life expectancy, but generates the question of what it means to be a living organism. Through researching modern fertility applications, along with historical paintings of human tissue, disease and microscopic cells, I will render images of the "grotesque body" and its sensations. This involves emphasizing inherited bodily forms that are pronounced by time and life events. In this way, I explore the evolution of genetics and fertility, playing with tensions of unease and intrigue arising from changing biotechnological environments.

Program of study: Master's
Faculty/Department: Art & Design
Place of creation: University of Alberta
Award: Semi-finalist Prize, Images of Research Competition 2019

09

Hidden Clues

Perez, Hector

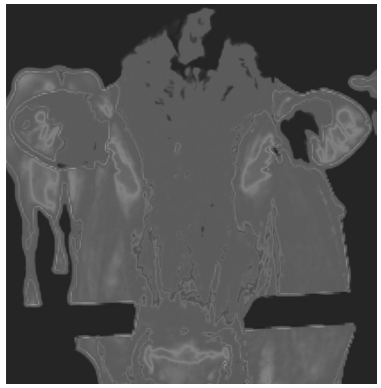


09

Hidden Clues

Author(s) / Creator(s): Perez, Hector

Infrared thermography is a non-invasive technique of thermal visualization by which temperatures are monitored and recorded. It is used to measure heat radiated from a surface which is then displayed as a temperature distribution image. Infrared pictures provide real-time data for various physiological conditions in cows and calves (eg. infectious diseases, parturition, and estrus). Infrared cameras can detect ovulation using skin temperature changes in the vulva and muzzle. Currently our project is using infrared thermography to measure physiological changes as temperature and skin dilatation added to behaviour estrus to increase heat detection in dairy cattle.

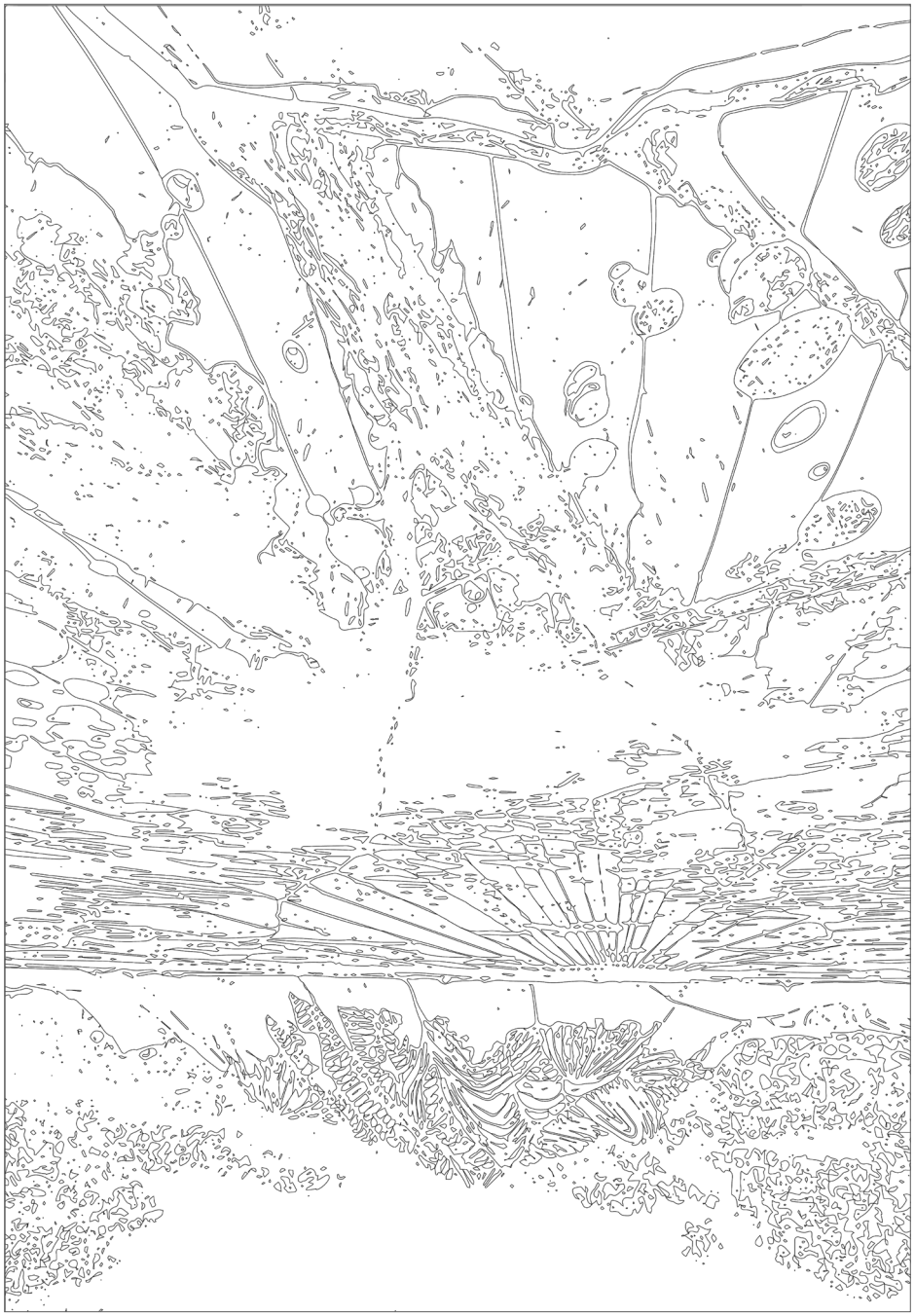


Program of study: Master's
Faculty/Department: Agriculture, Food and Nutrition Science
Place of creation: Dairy Research and Technology Science, University of Alberta

10

Wonder-trail
in Blue and Yellow

de Bruijn, Noemi

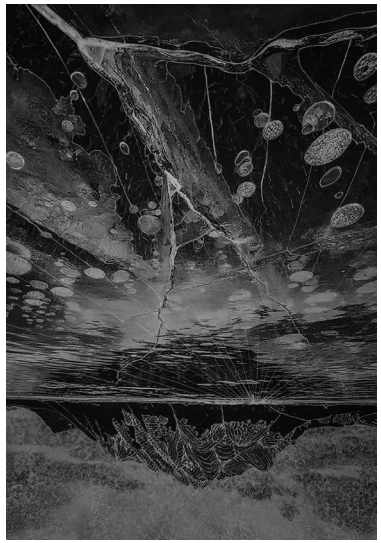


10

Wonder-trail in Blue and Yellow

Author(s) / Creator(s): de Bruijn, Noemi

My work/research focuses on our relationship with the environment. I'm concerned with what I call nature-culture dislocation. This relates to how we have distanced and mediated ourselves as a culture from the realities of the planet we live on. We curate everything that surrounds us, and photography is a great example of how this presents itself in modern life. I use photographs taken by myself or others and then work into them using print, painting, or drawing media. I also draw inspiration from topographical maps. I find that the contrast of art and science languages reflect the dislocation I speak of in my research. I enjoy to further exemplify this through altering the horizon lines of the landscape, hopefully enticing the viewer to have a second look and to reconsider what they are seeing in the imagery. For that moment I feel that I have achieved a reconnection to the landscape and the land, and that (I feel) makes my work worthwhile.

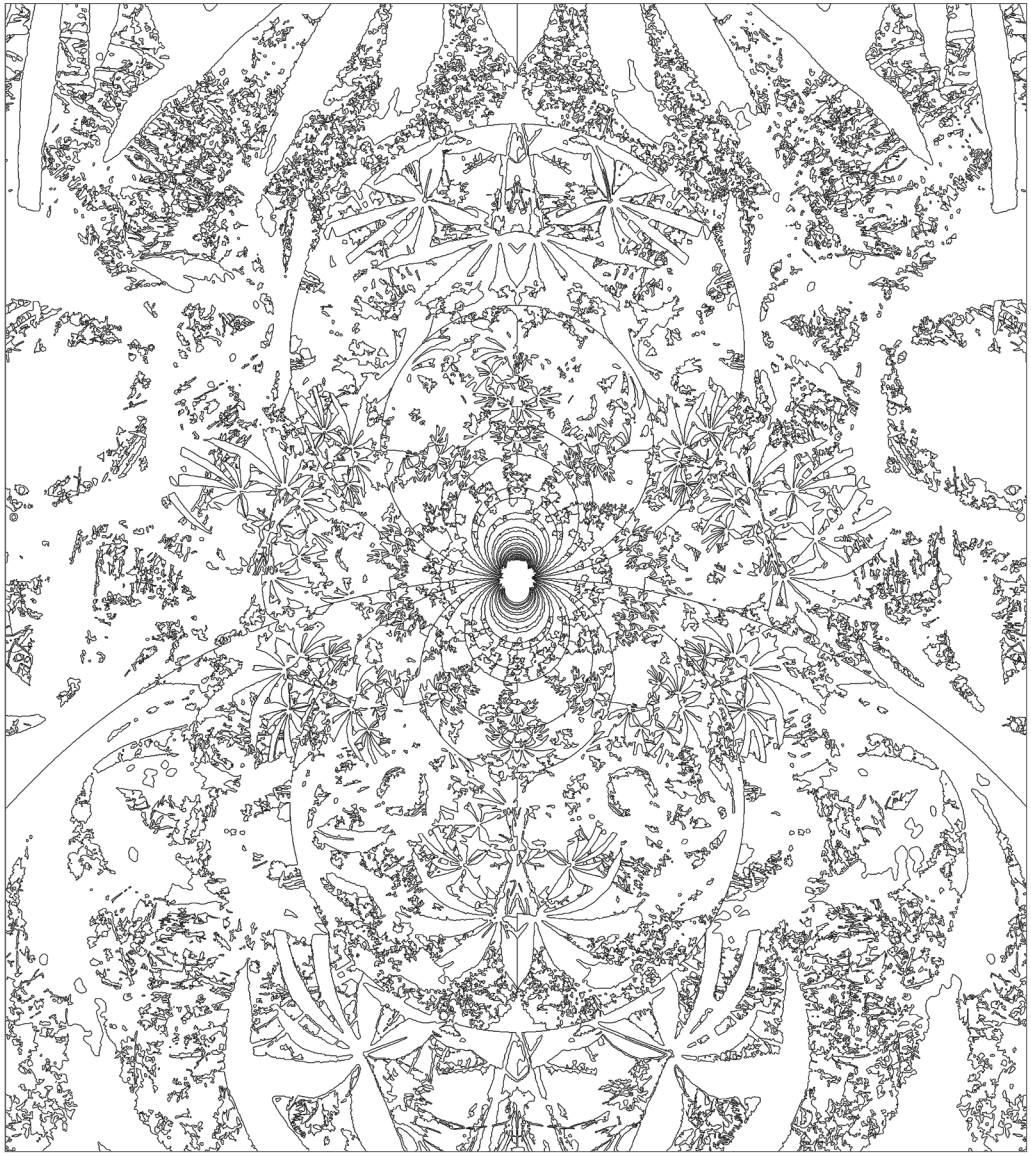


Program of study: Master's
Faculty/Department: Art & Design
Place of creation: Image taken at Abraham Lake, Alberta and developed at the University of Alberta
Award: Third Prize, Images of Research Competition 2017

11

Biochar Bloom

von Gunten, Konstantin



11

Biochar Bloom

Author(s) / Creator(s): von Gunten, Konstantin

Brazil is a fusion of powdery sands, mystic jungle, thundering waterfalls, and an exuberant carnival culture, much like the colors and shapes in the image presented here. Our focus is the Atlantic forest, the Mata Atlântica, which is home to many species, some of which live nowhere else on this planet. Around 85% of the Mata Atlântica have been deforested and unsustainable land-use techniques, such as the slash-and-burn land management, had a detrimental effect on the fertility of the leftover soil. While providing a short-termed boost with nutrients, this approach leaves the soil depleted shortly after. Following nearly forgotten Amazonian indigenous soil management practices, we joined a project on using biochar, charcoal made of biomass, for cost-effective and sustainable soil amelioration. It was applied in different ways to optimize its beneficial effects on soil stabilization and the growth of perennial crops, such as cassava. The image is made up of leaves of cassava plants on a backdrop of nearly virgin Mata Atlântica. Small-scale plantations in the midst of the Mata Atlântica – an agroforestry approach aiming at protecting the remains of this unique habitat in harmony with sustainable food production on the already deforested land.

Program of study: PhD
Faculty/Department: Earth & Atmospheric Sciences
Place of creation: Agradeço, Paraty, Brazil
Award: Third Prize, Images of Research Competition 2019

UNIVERSITY OF ALBERTA

Images of Research (IOR)

IOR is an opportunity for current University of Alberta graduate students and postdoctoral fellows from all disciplines to capture, share, and present the essence of their research in one image.

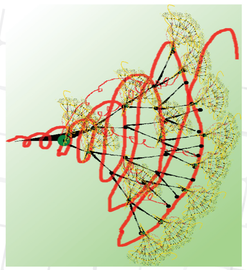
This competition and its month-long exhibition showcase and preserve graduate and postdoctoral research in print and digital form, foster engagement, and support graduate students' and postdoctoral fellows' academic and career endeavours.

This competition is organized by the University of Alberta Library (UAL) and the Faculty of Graduate Studies and Research (FGSR), and facilitated in partnership with Campus Design & Print Solutions.

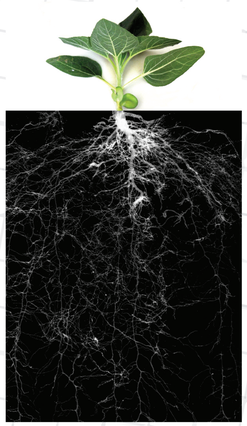
Our researchers push *the* ***boundaries*** *of* ***knowledge*** *to* ***create discoveries*** *and* ***innovations*** *that* ***improve our lives*** *and the* ***world****, and* ***help shape our future****.*

IMAGES OF RESEARCH

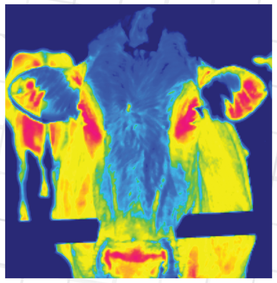
COLOURING BOOK







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