LOCAL ENVIRONMENTAL ACTION DEMANDED

The LEADer

HARVARD's TAR CREEK REMADE

This issue of the LEADer is an introduction to the instructor and a unique semester course offered at Harvard University for Graduate students in the School of Design to create landscape designs for Tar Creek's future. Each of the students are included with a short description of their projects. We hope to provide a wider discussion of their projects to the community, the Quapaw Business Committee and the Downstream tribes, to the EPA, DEQ and certainly the towns and county officials as they are more fully shared with us. The projects are innovative, culturally based and vetted by countless professional landscape designers who served as critics for the students.

Instructor: Niall Kirkwood

Tar Creek in Ottawa County, Oklahoma, a former lead mining area represents the failure at multiple levels of administration and overview to address decades of environmental degradation, toxic land conditions, and environmental injustice.

The story of the long-term reclamation of the forty square mile Tar Creek Superfund Site is presented here as a case study of future planning and design strategies that utilize the resources of local residents, stakeholders, and environmental organizations with the assistance of academic research institutions. I will argue that local-based transformations of the site, as opposed to 'top-down' actions, have the potential to act as a framework to unite community desires, address environmental cleanup, and regenerate sequentially over time the entire landscape of a polluted area.

This argues for a holistic way of viewing Superfund sites that acknowledges and then acts on the need for an incremental approach to land reuse and change within existing local social, cultural and ecological environments. It challenges the strategies that are currently brought to bear on these sites through the existing Superfund law and focuses on the complexity of these landscapes as places with attendant histories, ecologies, communities, and potential futures. It describes the nature, built fabric and materiality of these places and the normative and often simplistic means that have been used to alleviate their current conditions of degradation and contamination. In the end, it is the people, and the physical landscapes that they shape, restore, or reclaim for their daily uses and future utility, who are the inhabitants of sites such as Tar Creek, and that we turn to for guidance.

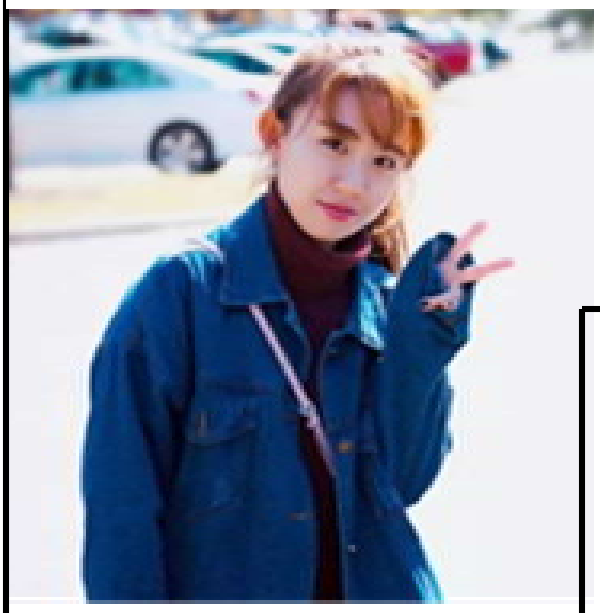
> As outsiders, we have to be careful when thinking about a landscape

The focus of this work is broadly concerned with the reclamation of derelict land, where the cleaning of land, water and soils becomes a sustainable infrastructural investment for the communities and stakeholders rather than just a selected environmental technique to be applied to a polluted site. The former mining works at the *Tar Creek Superfund site although under scrutiny since the early 1980's is still in its very early days of recovery and planning – serves as a useful model for this approach.*

Professor Kirkwood spoke at LEAD Agency's Tar Creek Conference and never forgot what he saw and never forgot the people he met and the great unmet needs here.

Niall Kirkwood is Professor of Landscape Architecture and Technology and Associate Dean for Academic Affairs at the GSD. His work over the last thirty years has mainly focused on the post-industrial landscape globally and the remediation, regeneration and reuse of sites including lands of mining extraction, waste landfills, former industrial manufacturing and steel plants. Kirkwood has carried out research and design practices on abandoned, polluted and idled mining lands in Asia, North America and Europe as well as spent time on the Tar Creek Superfund Site between 2004-2005 as part of the joint GSD/Harvard School of Public Health Project titled- '*A Community-Based Study of Lead-Exposure Pathways, Biomarkers of Dose, Health Effects and Phytoremediation Strategies*' funded by NIEHS RFA ES-99-001, Superfund Hazardous Substances Basic Research Program.

Weave the Unseen
Beginning with Microrganisms



Hao Holly Wang

The presentations began with Holly's "Weave the Unseen" looking at the way wind moves around chat piles and understanding the remaining waste at the Tar Creek Superfund site will be left in mounds of unusable chat waste. Placement of these piles can reduce wind and spread of chat until the piles are capped and covered. Phytoremediation will occur because of the particular plants used on these mounds. These areas can later provide space for gathering, perhaps as large sized "Outdoor Classrooms" to teach about the site and it's varied issues. Plants grown on the mounds and the surrounding acreage can provide cover for any remaining waste, but will also provide forage for wildlife and cattle grazing there.

Chat Pile Microclimates
Basing Back to Culture and Renewing the Use

Au Sun reminded us that the Quapaw were mound builders and are in the process of building new ones on their land mounding contaminated and unusable materials into structures that can resemble their past. Reshaping their land grouping piles with wisdom of wind direction will create microclimates, these sites become classrooms of evolving environment and reminders of past culture. As she states the land raised the people and in return the people will nurture the land and embed their spirits in the land through religious and cultural activities. These "new" piles provide landscape with layers for phytoremediation that can be used by the people who claim them and gain local identity from them.

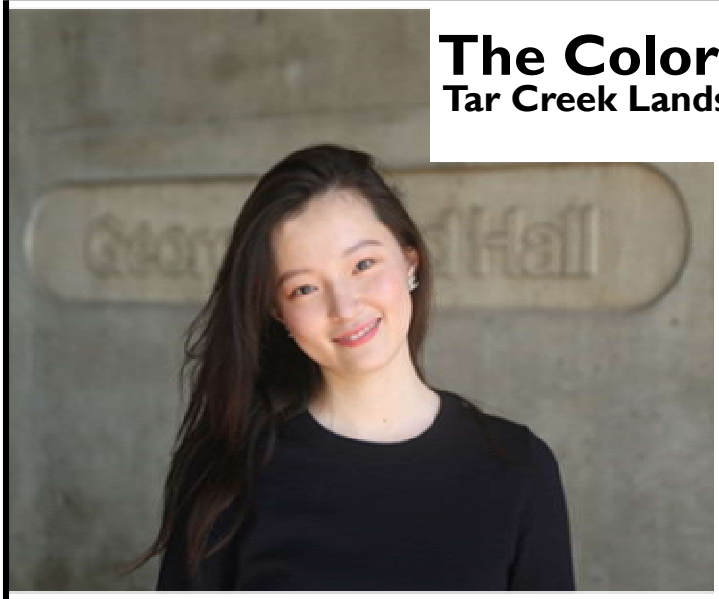
Vicky Qing Wang

The Healing Power

The Healing Power presented by Vicky Wang took us to landscape of tribes and bison that was left with sink holes and mine waste. Life after the chat piles, will transform and compensate tribal and non-tribal people both spiritually and materially.

Vicky suggests using a series of remediation technologies be used to remove lead in water, suppress dust in the air and clean lead in soil using an established treatment. The cleaned chat piles will become a base for the tall-grass prairie and regenerative farms where tours of healing are formed with diverse programs that meet the needs of the local residents.

New industries will invigorate the local economy with a livable landscape where people can live more independently with an agricultural, a self-healing and growing future.



The Colorful Past and Future

Tar Creek Landscape Remediation Process Visualization

Jinying Zhang

Ms Zhang saw our site with these originally aesthetically striking colors and through her project these colors will shift dynamically as our environment is cleansed and our landscape changes. Through a series of wetlands and ponds, the colors will indicate the metals that are present and as they are removed, the colors will mark that improvement. This cleaned water will be an asset and will be sent through underground pipeline systems to take the clean water to nearby targeted zones for agriculture, recreation or consumption. This landscape remediation can be visualized by the actual changes in the colors of the water.

An Sun

Collecting, Exchanging, Evolving

Acid Mine Drainage Water and Chat Dust Landscape

Targeted interventions will be needed to begin to "un-twist" the damage and allow the people to build a new future. The land can be associated in a new evolved Tar Creek no longer with a disheartening remembrance of the land. Olivia proposes a large passive water treatment site to deal with the acid mine water discharges, capping the structures of contaminated soils and un-sellable chat mounded in the site so that sustainable native plants will be able to be permanently left to grow and protect the chat from exposure. She also addressed the flooding and loss of the Riverview Park in the town of Miami, OK with a series of detention ponds that can be built that will allow pathways for citizens to access the river during high water events in a safe manner.

Olivia So

Taking the Tar Creek Remade Studio - Remotely via Zoom

For a semester each Monday morning at 7:00 and Thursday afternoon at 2:00, I have joined a class of 10 Harvard landscape architect students for over a hundred class hours in a process as they developed their projects to re-make Tar Creek. Having never attended any architecture class before, having no background to bring other than a true desire to have this place, this creek and our communities get a do-over, I humbly sat with Niall Kirkwood's class and participated in the process.

Earl Hatley, LEAD Agency's Grand Riverkeeper joined in the sessions from Vermont while half of the students joined each week from their homes in China, since all classes at Harvard have been remote this year.

We sat together and throughout the class sessions professional landscape architects joined to present their styles and to serve as critics for the student work as it progressed through the winter and into spring. During the last moments of the class Earl had to ask the question we both had failed to ask: how did the students decide what to take on, which of the issues at Tar Creek, and there are many, how did they select their project goal?

Earl suggested perhaps all of our issues were put in a hat and each student pulled one out? No, Niall said he "had not divvied them up but they each had decided on their own. Studios are driven by the students, with the freedom to promote their own ideas."

The class came about because of Niall's visit twenty years ago with 3 other Harvard professors. "The impression the people, the reception, the circle dance in the gymnasium, the Toxic Tour, Tar Creek, the chat piles and my now frayed t-shirt, the visual memories haunt me forever and are deep and centered in what I am interested in. This is only a start of how we will engage. This is not the end, it will carry on. "

Kurt Frantzen joined each class to offer advice on the technical aspects required to deal with the environmental issues at the Tar Creek Superfund site and the downstream issues.

Niall invited community members and researchers who knew our issues to join in the voices the students would meet. Georgeann Roye, a Harvard graduate, grew up with Tar Creek in her backyard, and flooded the home which had to be demolished,. With her law degree she is raising children on a family farm. She spoke to the students about sustainable farming. Georgeann had introduced me to James Walkingstick, who then joined the LEAD Agency board of directors also visited the class, as a Harvard student himself, giving his Ottawa County, Cherokee residential perspective.

Bill Andrews, USGS had conducted important research he presented to the class on how the local plants and trees uptake heavy metals from our soils. He later said, “having the opportunity to lecture to this class is very likely to remain the pinnacle of my 30+ year career. I will remember it fondly.” Laurel Schaider shared her findings after years of research at our site while at Harvard herself. Ed Keheley contributed photographs and maps for the students to use. Mark Grigsby’s work at NEO inspired students to incorporate the college in projects. Hearing from Grace Goodeagle and then Craig Kreman on the work the Quapaw Nation is currently doing gave their projects real purpose, while Betty Gaedtke’s Quapaw pottery designs inspired class members.

I have long thought this place will only find the solutions and the reclamation deserved by establishing relationships with people with vision, skills and training and ultimately the power who will see this place but also see and experience us, each of us they encounter as people who matter, who have lives that matter and desire to live in places students like these can design to become environmentally safe.

We will always be grateful to Niall Kirkwood for remembering his experiences, the challenges we face, but mostly for remembering us and allowing us to meet his friend Kurt and his huge cadre of colleagues who so kindly guided these students with their projects throughout the semester.

These students took on Tar Creek and with their projects for it to be Remade and gave hope where there has been none. *Wa do ~ Rebecca Jim*

Shirt design by Todd Willard—MISACO

Reroute, Recirculate, Remediate

Using technology and landscape remediation strategies

My project focus on environmental justice will treat acid mine drainage using engineering principles and community engagement. This landscape is a sponge, a complex filtration system: scarred, poriferous, accessible across varying thresholds. Water constantly flows, from the aquifers through the mines and out downstream into creeks and rivers. My strategy to remediate Tar Creek emulates the strategy against a venomous snake bite-obstruct circulation to prevent the spread of the toxins from contaminating the veins of the rest of the body. The body is the landscape of Picher, the Quapaw Tribe, of Oklahoma, of the US. We must isolate the point of conflict and resolve it before it can be reintroduced back into the greater system so this land shall be reclaimed by the Quapaw Tribe. Reroute both Lytle and Tar Creek and treat the mine discharges in two designated areas so the water coming out after treatment is clean. The new creek routes can provide clean water and great enjoyment.

Dianne Le

"She has figured out how to get the acid mine water out of the way. I love it. It is a valid idea that moves the water out of the epicenter and lets the cleanup begin." Earl Hatley

Dianne's poster will be available as postcards through LEAD Agency. We are asking for your suggestions for the short message that should be printed on the backside. Email your suggestions to leadagency@att.net

While Tar Creek is a scar on this earth, it will be REMADE!

We appreciate and deserve these great minds to come together and holistically visualize how Tar Creek can heal itself and allow the Quapaw and the community to come home and appreciate its exceptionality. Craig Kreman

Jackie Chen

Restoring Downstream

A Tar Creek Landscape Revitalization Plan for Community and Water

Jackie and Alykhan worked together throughout the 14 week semester on the wide holistic approach to the entire site. They begin with an understanding of the Quapaw and the translation in the tribal language meaning "The Downstream People."

Centering on the water as integral to all life, the pair focus on the critical corridor Tar Creek, ascribing legal rights of environmental personhood, as a living

Alykhan Neky

The project advances a holistic revitalization plan for several small towns in Ottawa County, Oklahoma. Three nodes along the river are selected to illustrate this plan's key development themes: land remediation (site1), community integration (site 2), and research and education (site 3). The project title "Restoring Downstream" speaks only to riparian rehabilitation, but to the river's new role as a social development vector for the Quapaw Nation and other downstream tribes and other neighbors.

PHYTOSTABILZATION
ACTIVE & PASSIVE WATER TREATMENT
CONSTRUCTED & NATURAL WETLANDS
PHYTOREMEDIATION

"Negative" Fields

A Phyto-Future: Sinkholes and Digital Landscape

Joyce Siqi Zhu

Her photo is shown on the back page

Joyce's project explores the negative sinkholes as potential sites to encourage new remediation typologies and forms of digital landscapes. By applying membrane adsorption and ultrafiltration techniques, water get filtered when entering filtration pods. Selected wetland plants will be planted to help phyto-solidify heavy metals. Drones, robotic and elevated sectional metal walkways will be used for planting, maintenance and harvesting. Mark Grigsby suggested these be constructed with lightweight materials since the ground is unstable near those sites. The function of the site will adjust to reconcile the dynamism and width/levels of the sinkholes. Video cameras will be placed around sinkholes to document the changes of plants and the potential growth of the sinkholes. Livestreaming will be broadcasted and go on tour all over the American cities to raise awareness of Tar Creek and the superfund site. The project will expand these pioneer installations through larger contaminated fields over the entire superfund area. The project reimagines the mining scars of sinkholes and land subsidence as numerous dots of positive greenness that will finally embrace the site's future.

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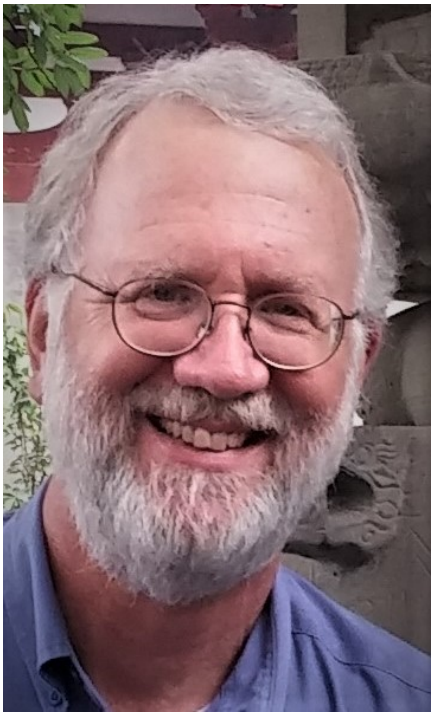

Kurt Frantzen Environmental Consultant

For me though this was an opportunity not simply to teach but help ten young professionals to learn problem solving by working on a real-world problem and to see environmental problems in all of their dimensions: time and space, biotic and abiotic world, past and future, ecology and human culture, injury and healing, pain and hope, and technology and natural processes, among others. This studio provided education to a few, but created new visions of possible solutions for many more. For me, Guattari's sentiment, "nature cannot be separated from culture," captures some of what I have learned this semester from Rebecca, Earl, and your colleagues,

Now more than ever, nature cannot be separated from culture; in order to comprehend the Interactions between ecosystems… we must learn to think transversally.

~ The Three Ecologies by Felix Guattari

Dr. Frantzen, Ph.D. has advised Niall Kirkwood's classes for 18 years, by interfacing science, engineering, and planning to resolve complex property contamination matters. A biochemist by training, with over twenty years of experience in environmental risk analysis, hazardous waste site/Brownfields investigation/remediation, environmental R&D, He is a Certified Hazardous Materials Manager (CHMM).

Healthy Tar Creek: Phagocytize the BrownScape

Tar Creek, the victim of toxic industrial legacy is roaring its pains to the contaminated land, acid water, lifeless plants and people.

This project aims to take the most urgent problem: the health of Tar Creek, ecologically, hydrologically, culturally and technically. Design strategy follows the flow of Tar Creek, from the upstream to the downstream. Building on tribal history and inspired by the regional prairie ecologies of Oklahoma the re-imagined upstream land will rise the contaminated cropland back to the Tall grass prairie preservation area. The benefits from prairie and wildlife are used for rehabilitating the devastated earthwork into a self-healed healthy land. Native trees, shrubs, and aquatic plants will comprise a vibrant landscape along the dynamic creek.

The design strategies proposed are a cohesive, layered approach to practically restoring the affected landscape for the healthy tribal communities.

Yokkie Wang

"I hope our design can help Ogaxpa (Quapaw), the land, the people and its future."

Let us look forward to the pleasing landscape of the future.

Chief John Ross

Joyce Siqi Zhu

Joyce hoped, as we do that through this work, "the landscape could become beloved."

The conclusion to the Harvard studio is inconclusive and simple.

The students through the studio course have researched, studied and made proposals for the land and landscape of Tar Creek and its communities. This practice perhaps corresponds to how professional planners and designers work in this country in the contemporary period. However, I can only end by quoting the logic by which the students have had to live by these last fourteen weeks, a logic for all its stoicism has in it the seed of an affirmative vision: every time we view the images of Tar Creek and its orange-red waters and see the outline of the chat piles it makes us work harder to effect positive and forward looking changes to the landscape that are healthier, sustainable and based on the needs and desires of the people of the Tar Creek area.

~ Niall Kirkwood