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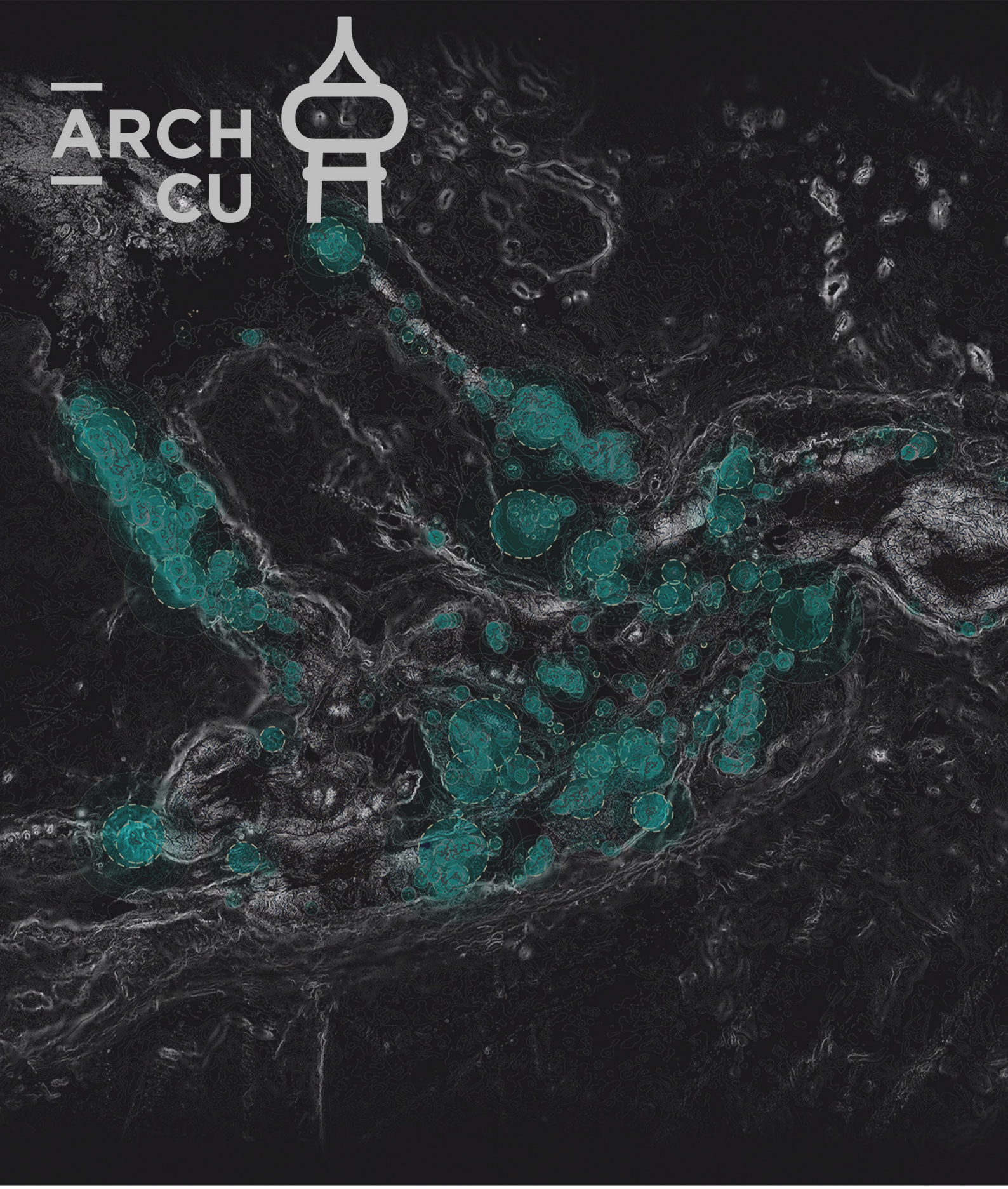


Photograph: Center for Climate Adaptation, Pratt Institute

Lecture

ARCHIPELAGIC INFRASTRUCTURE: PLANETARY PERSPECTIVE

26 FEBUARY 2025

ARCHITECTURE & DESIGN FOR SOCIETY LECTURE SERIES AY2024

ARCHIPELAGIC INFRASTRUCTURES: A Planetary Perspective

วันที่ 26 กุมภาพันธ์ พ.ศ. 2568 ณ คณะสถาปัตยกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย

ผู้บรรยายโดย Associate Professor David Erdman, Center for Climate Adaptation, Pratt Institude

เมืองที่เติบโตเร็วที่สุดในโลกกว่าครึ่งตั้งอยู่บนเกาะ ล้อมรอบไปด้วยน้ำ ซึ่งต้องเผชิญกับความท้าทายรอบด้าน ทั้งพื้นที่จำกัด การขาดแคลนน้ำ และไม่มีที่ให้อพยพหนีรับมือจากภัยพิบัติ ขณะเดียวกัน ปัญหาโลกร้อนก็ส่งผลกระทบขึ้นเรื่อย ๆ จากกิจกรรมของมนุษย์ โดยเฉพาะการเผาไหม้เชื้อเพลิงฟอสซิลที่ปล่อยก๊าซเรือนกระจก ทำให้โลกร้อนขึ้น ส่งผลให้ระดับน้ำทะเลสูงขึ้น อุณหภูมิเพิ่มขึ้น เกิดภาวะแห้งแล้งและน้ำท่วม ซึ่งกระทบอย่างหนักต่อชุมชนชายฝั่งและเกาะต่าง ๆ

ในการบรรยายของคุณเดวิด เขาได้นำเสนอการมองโครงสร้างพื้นฐานในมุมใหม่ โดยเน้นที่ภูมิทัศน์แบบหมู่เกาะ (archipelagic landscape) โดยเฉพาะวิธีการจัดการกับน้ำ พื้นดิน และสภาพภูมิอากาศ แทนที่จะมุ่งเน้นเฉพาะระบบขนาดใหญ่ในแผ่นดิน เช่น ทางหลวงหรืออาคาร เขาชวนให้เราหันไปพิจารณาเกาะ ชายฝั่ง และชุมชนขนาดเล็กด้วย ทศวรรษข้างหน้าจะต้องการแนวทางการออกแบบเมืองที่สามารถปรับตัวต่อสภาพภูมิอากาศที่เปลี่ยนไป

เขามองโครงสร้างพื้นฐานอย่างระบบสาธารณูโภค ระบบขนส่ง ระบบสื่อสาร และโครงสร้างพื้นฐานที่จำเป็น ว่าไม่ใช่สิ่งตายตัวหรือแยกขาดออกจากกัน แต่ควรเป็นระบบที่ยืดหยุ่น ใช้ร่วมกันได้ และแก้ปัญหาสถานการณ์ได้จริง เขาเรียกร้องให้มองปัญหาภูมิอากาศผันผวนเป็นภัยพิบัติระดับโลก เพราะภาวะโลกร้อนส่งผลให้ระดับน้ำทะเลเพิ่มขึ้น อุณหภูมิสูงขึ้น และเกิดวิกฤตน้ำทั่วโลก ส่งผลอย่างยิ่งกับหมู่เกาะและเมืองตามชายฝั่ง ซึ่งปัญหาเหล่านี้ไม่ได้เป็นแค่ปัญหาตามท้องถิ่น แต่กระทบกับทั้งโลก

เพื่อรับมือกับวิกฤตสภาพภูมิอากาศอย่างจริงจัง จึงมีการก่อตั้ง Center for Climate Adaptation ซึ่งเป็นศูนย์วิจัยที่เน้นการแก้ปัญหาผ่านการออกแบบ โดยรวบรวมผู้เชี่ยวชาญจากหลากหลายสาขา เช่น นักสถาปนิก วิศวกร นักวิทยาศาสตร์ นักกฎหมาย นักธุรกิจ รวมถึงชุมชนท้องถิ่น มาทำงานร่วมกัน จุดมุ่งหมายคือการคิดค้น แนวทางแก้ไขที่อิงธรรมชาติและสามารถนำไปใช้ได้จริง เพื่อให้ชุมชนสามารถรับมือกับการเปลี่ยนแปลงสภาพภูมิอากาศได้ทัน ก่อนที่ผลกระทบจะรุนแรงเกินควบคุม

กรณีศึกษาที่ 1 หมู่เกาะทางตะวันออก (Eastern Archipelago)
The Big U, New York, United States, 2013

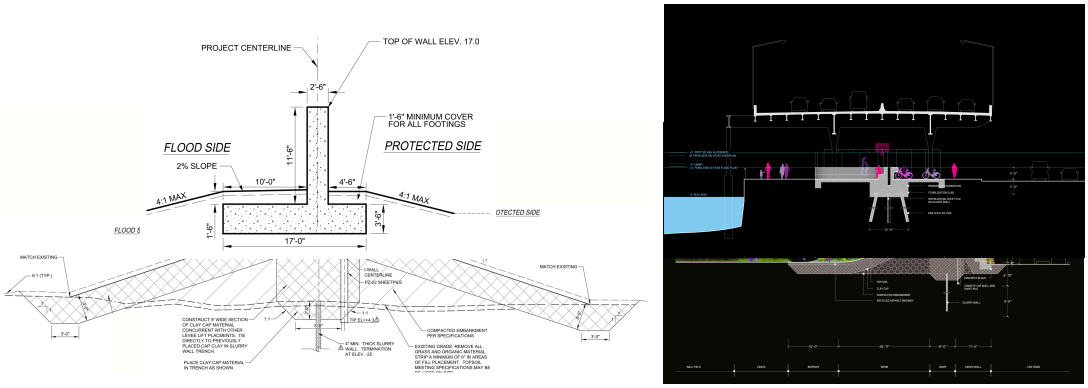
นิวยอร์กเป็นหนึ่งในเมืองที่มีความหนาแน่นของประชากรสูงมากที่สุดโลก และมีสภาพภูมิอากาศที่ผันผวนเป็นอย่างมาก เนื่องจากลักษณะทางภูมิศาสตร์ของเมืองนิวยอร์กนั้นล้อมรอบด้วยน้ำ ทำให้ได้รับผลกระทบจากระดับน้ำทะเลที่สูงขึ้น คลื่นพายุที่พัด และมีสภาพอากาศที่ต่างกันที่ขั้วทั้งร้อนอบและหนาวเย็น ล้วนเป็นภัยคุกคามต่อประชากรและโครงสร้างพื้นฐานของเมืองทั้งด้านระบบสาธารณูปโภค ระบบขนส่ง และระบบสื่อสาร

Aerial View of The Big U, New York, United States, 2013

The Big U เป็นโครงการแสดงถึงความยืดหยุ่นของตัวเมือง ซึ่งออกแบบมาเพื่อรับมือกับปัญหาน้ำท่วมและพายุเฮอร์ริเคนแซนดี้ ที่พัดเข้าฝั่งในแมนฮัตตันจากความผันผวนของสภาพภูมิอากาศ โดยมีการวางระบบป้องกันน้ำท่วมรอบเกาะแมนฮัตตัน เช่น กำแพงกันน้ำ คันดิน และสิ่งกีดขวางอื่น ๆ

นอกจากจะเน้นการป้องกันภัยพิบัติแล้ว The Big U ยังผสานแนวคิดความยืดหยุ่นไว้ในโครงสร้างเมืองผ่านการพัฒนาพื้นที่สาธารณะ โดยคำนึงถึงความเสมอภาคทางสังคม และผลกระทบต่อสิ่งแวดล้อม เปลี่ยนการรับมือภัยพิบัติให้กลายเป็นโอกาสในการฟื้นฟูเมืองไปในตัว โดยผสานการออกแบบที่ยั่งยืนใช้งานได้จริง และวัฒนธรรมเข้าไว้ด้วยกัน เพื่อสร้างเมืองที่ปลอดภัยและปรับตัวได้ดีขึ้นสำหรับคนรุ่นต่อไป

Typical Levee Berm, Flood Protection, The Big U, New York, United States, 2013

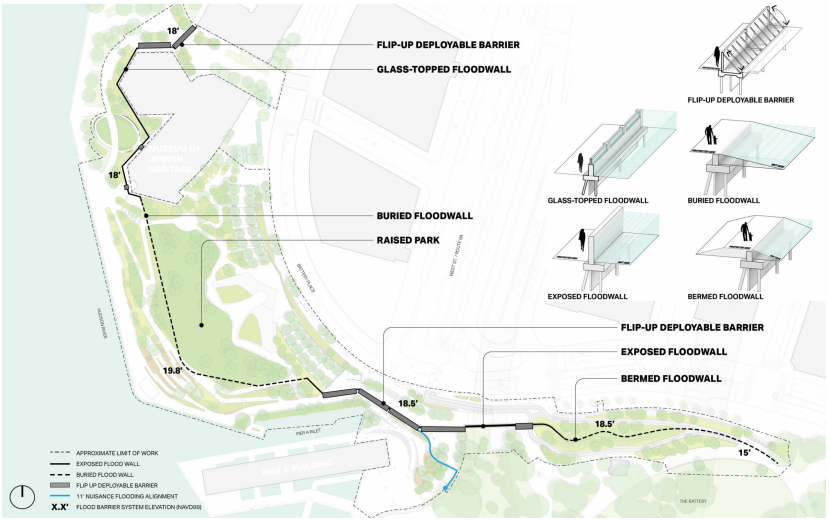


Typical T-Wall, Flood Protection, The Big U, New York, United States, 2013

กรณีศึกษาที่ 2 หมู่เกาะทางตะวันออก (Eastern Archipelago)

South Battery Park City Resiliency, New York, United States, 2023

โครงการนี้ปกป้องชายฝั่ง โดยไม่พึ่งพาแค่กำแพงกันน้ำเพียงอย่างเดียว แต่ประยุกต์ใช้ธรรมชาติเป็นตัวช่วยผ่านการยกระดับพื้นที่สร้างเนินเล็กๆ และเพิ่มพื้นที่สีเขียว ซึ่งไม่เพียงช่วยป้องกันน้ำท่วม แต่ยังสร้างพื้นที่สาธารณะให้คนในเมืองได้ใช้งานและพักผ่อน เป็นตัวอย่างที่แสดงให้เห็นถึงเมืองที่สามารถปรับตัวต่อสภาพภูมิอากาศ และยังคงความน่าอยู่อย่างสมดุลได้ในเวลาเดียวกัน



Flood Protection System at South Battery Park City Resiliency, New York, United States, 2023

โครงสร้างพื้นฐานตามชายฝั่ง (Coastal Infrastructure) ประกอบด้วยแนวป้องกันถาวรและแบบเคลื่อนย้ายได้ ที่ออกแบบให้กลมกลืนโดยรอบอย่างลงตัว องค์ประกอบสำคัญ ได้แก่ แนวกำแพงแบบพลิกขึ้นได้ที่ซ่อนไว้จนกว่าจะเกิดพายุ กำแพงกระจกที่ป้องกันน้ำโดยไม่บดบังทัศนียภาพ กำแพงกันน้ำที่ฝังหรือเปิดโล่งเชื่อมต่อกับทางเดินและพื้นที่เปิด กำแพงดินที่รวมอยู่กับพื้นที่สีเขียวในสวนสาธารณะ และการยกระดับพื้นที่สวนให้เป็นแนวกันชนธรรมชาติต่อระดับน้ำทะเลที่เพิ่มขึ้น แนวทางแบบเป็นชั้นนี้ช่วยปกป้องเมืองจากภัยน้ำท่วม พร้อมรักษาความเป็นพื้นที่สาธารณะ แสดงให้เห็นว่าโครงสร้างพื้นฐานนั้น ใช้งานได้และเข้าถึงได้ในเวลาเดียวกัน

กรณีศึกษาที่ 3 หมู่เกาะมลายู (Malay Archipelago)
The Tuas Port Reclamation Project, Singapore, 2015

หมู่เกาะมลายูเป็นกลุ่มเกาะที่ใหญ่และมีประชากรในหมู่เกาะมากที่สุดในโลก โดยมีประเทศสิงคโปร์เป็นศูนย์กลางของหมู่เกาะมลายู สิงคโปร์หรือเกาะขนาดเล็กนี้ ได้สร้างความโดดเด่นระดับชาติจากการพึ่งพาด้วยตัวเองด้านทรัพยากรน้ำท่ามกลางความผันผวนของระดับน้ำทะเลที่สูงขึ้นและข้อจำกัดเรื่องพื้นที่ของสิงค์โปรที่เป็นเกาะเล็ก เทียบพื้นที่มีขนาดเป็นสามส่วนสี่ของนิวยอร์ก สิงคโปร์จึงลงทุนพัฒนาโครงสร้างพื้นฐานอย่างเป็นระบบ ทั้งด้านการจัดการน้ำ ป้องกันชายฝั่ง และการวางผังเมืองที่เป็นมิตรต่อสิ่งแวดล้อม

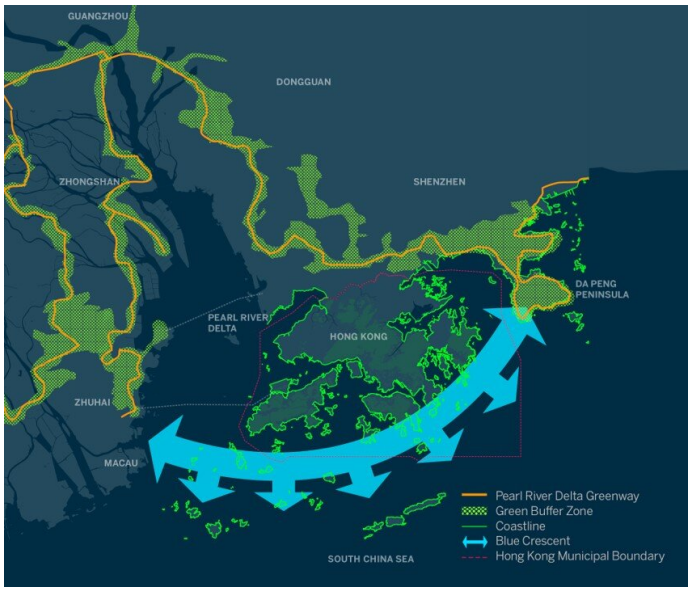
Singapore, Sim Chi Yin/VII, for The New York Times

Caissons, or watertight retaining structures, that are part of the project.Credit...Sim Chi Yin/VII, for The New York Times

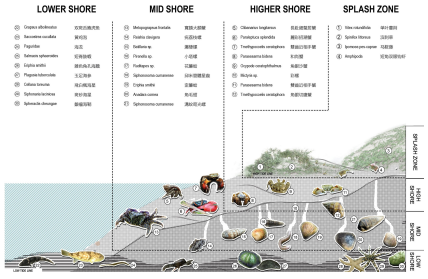
โครงการนี้แสดงให้เห็นว่าเมืองสามารถทำงานได้อย่างเป็นระบบและพึ่งพาตนเองได้ คล้ายกับเกาะหนึ่งในหมู่เกาะ ซึ่งสะท้อนให้เห็นว่าแม้ในสภาพแวดล้อมเมืองที่หนาแน่น ก็ยังสามารถปรับตัวและมีความยืดหยุ่นต่อการเปลี่ยนแปลงสภาพภูมิอากาศได้

กรณีศึกษาที่ 4 เกาะฮ่องกง (Hong Kong Archipelago)
Cyberport, Hong Kong, 2020

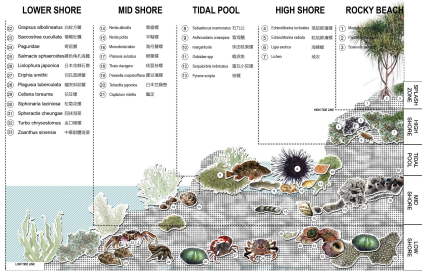
ฮ่องกงเป็นเมืองเกาะที่มีประชากรหนาแน่นสูงและไม่มีพื้นที่ให้ถอยร่นจากระดับน้ำทะเลที่สูงขึ้นและพายุ เมืองริมชายฝั่งจึงเผชิญความเสี่ยงจากภัยพิบัติทางธรรมชาติมากขึ้น โดยเฉพาะภัยน้ำท่วมและพายุที่ผ่านมา โครงสร้างพื้นฐานของเมืองมุ่งเน้นที่การป้องกันน้ำด้วย เขื่อนกันคลื่นและกำแพงกันน้ำ



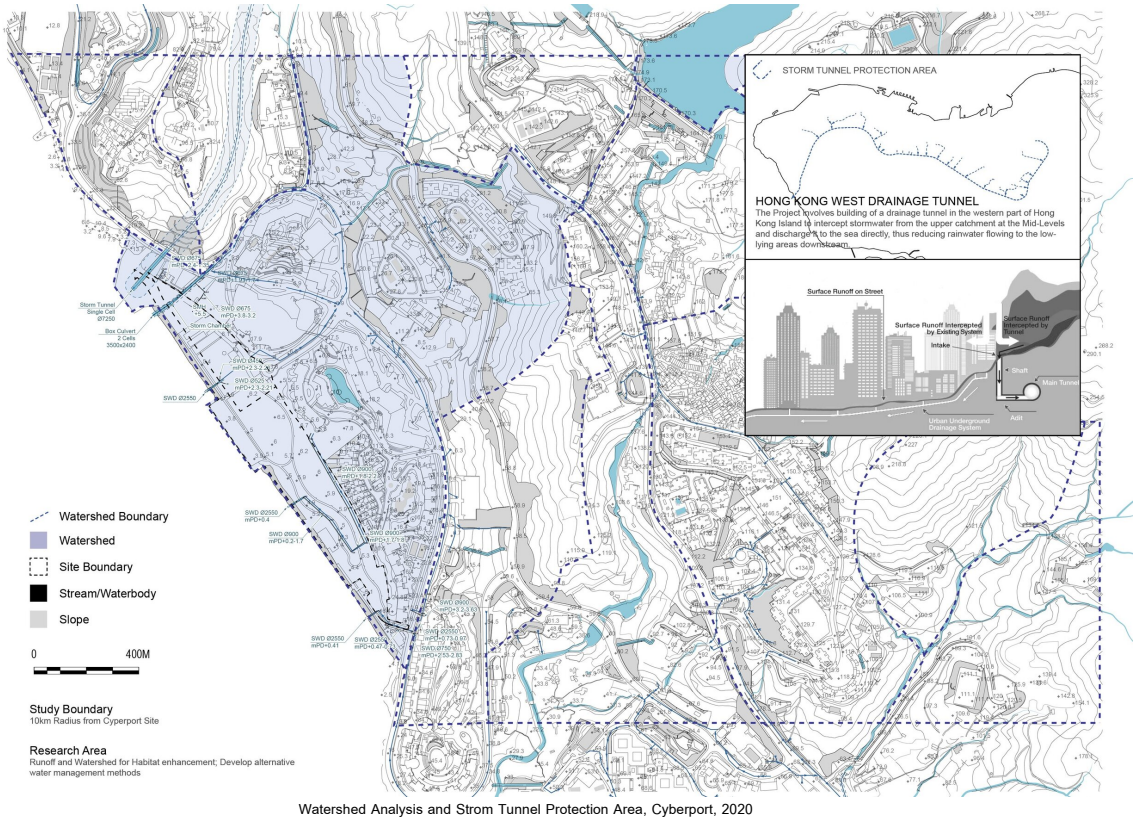
Illustrating of Blue Crescent coastal management zone protections for marine habitats and careful management of fishing, land reclamation, and shipping zones



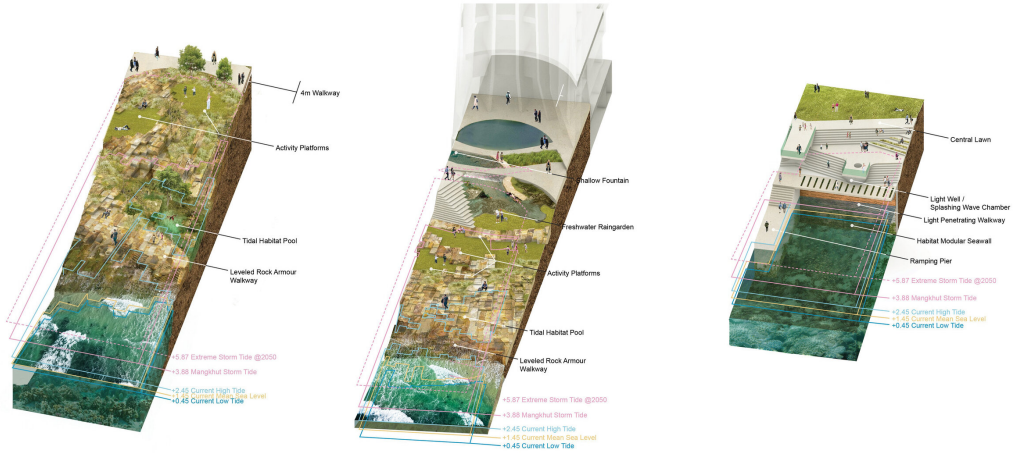
Ecology of Sandy Shore Habitat



Ecology of Sandy Shore Habitat

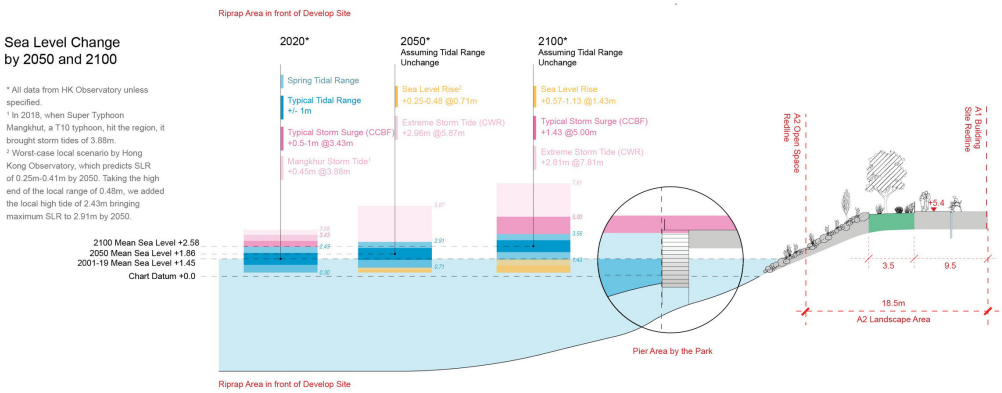


Watershed Analysis and Strom Tunnel Protection Area, Cyberport, 2020



Coastal Infrastructure, Cyberport, 2020

Cyberport เป็นสวนสาธารณะริมน้ำที่ตั้งอยู่บริเวณรอยต่อระหว่างตัวเมืองและชนบท ซึ่งเป็นพื้นที่ตัวอย่างของแนวคิดการอยู่ร่วมกับธรรมชาติแทนการควบคุมธรรมชาติ พื้นที่เหล่านี้เปิดโอกาสให้เราทบทวนแนวคิดเรื่องความยืดหยุ่นใหม่ โดยสนับสนุนแนวทางที่ยืดหยุ่นและอิงธรรมชาติ ซึ่งสามารถตอบสนองต่อสภาพน้ำและช่วยให้เมืองชายฝั่งอย่างฮ่องกงเตรียมรับมือกับอนาคตได้อย่างยั่งยืน



Sea Level Change by 2050 and 2100, Cyberport, 2

ARCHITECTURE & DESIGN FOR SOCIETY LECTURE SERIES AY2024

ARCHIPELAGIC INFRASTRUCTURES: A Planetary Perspective

26 February 2025 at the Faculty of Architecture Chulalongkorn University

PARTICIPANTS: Associate Professor David Erdman, Center for Climate Adaptation, Pratt Institude

Over half of the world's fastest-growing urban areas are located on islands, facing significant challenges such as limited land, water scarcity, and no space to retreat. At the same time, climate change continues to worsen. Human activities, particularly burning fossil fuels, release greenhouse gases that trap heat in the atmosphere, causing the Earth to warm. This warming results in rising sea levels, increasing temperatures, water scarcity, and flood risks, which are especially dangerous for islands and coastal cities.

In his lecture, David Erdman reorients our view of infrastructure by focusing on archipelagic landscape, especially how we deal with water, land, and climate. Instead of only focusing on big, central systems on land like highways or buildings, we should also look at islands, coastlines, and smaller communities. The coming decade will require design forward solutions in urban area which must adapts to new and altered climate.

He views infrastructure as flexible, shared, and responsive, rather than fixed or isolated. He urges a planetary perspective on climate change, the warming of the planet, resulting in rising sea levels, temperature increases, and water-related crises that put island and coastal communities at high risk emphasizing that that these problems are not local, they affect the whole world.

To address these pressing issues, the Center for Climate Adaptation serves as a hub for design-based research, bringing together architecture, engineering, science, law, and business with local community and industry partners. The goal is to develop realizable, nature-based solutions to help these vulnerable communities adapt before it's too late.

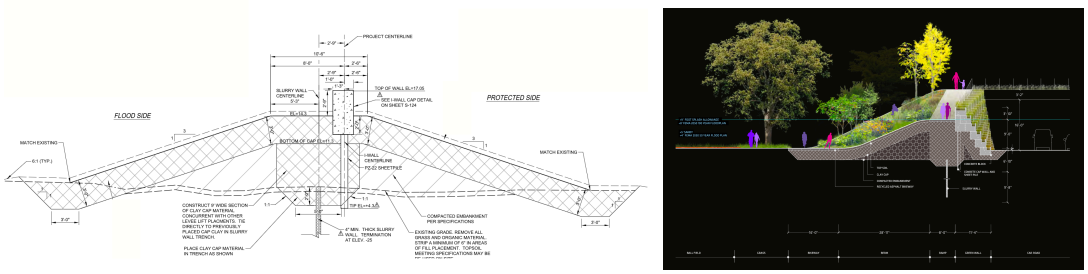
CASE STUDY 1: Eastern Archipelago

The Big U, New York, United States, 2013

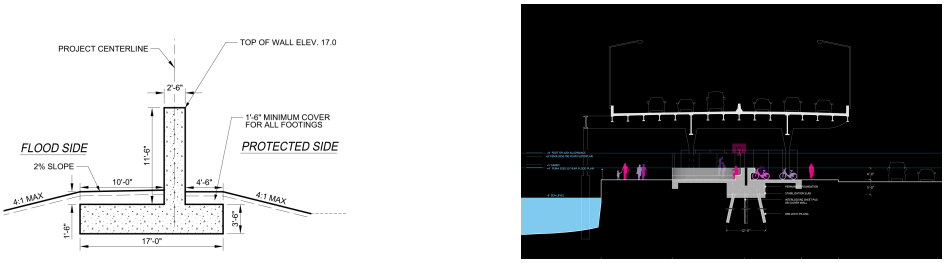
Newyork is one of the most dense city and highly vulnerable to climate change due to its geography, being made up of multiple islands surrounded by water. Rising sea levels, storm surges, and extreme weather events pose significant risks to its dense population and infrastructure.

Aerial View of The Big U, New York, United States, 2013

The Big U is presented as a visionary urban resilience project designed to protect lower Manhattan from climate change impacts, especially flooding and storm surges. Initiated in response to Hurricane Sandy, the project involves creating a comprehensive flood protection system around the southern tip of the island, incorporating flood walls, berms, and other barriers. Beyond merely providing defense, The Big U integrates resilience into the urban fabric by enhancing public spaces, ensuring social equity, and considering environmental impacts. The project aims to transform flood protection into an opportunity for urban renewal, blending sustainability, functionality, and cultural considerations to create a safer, more adaptive city for future generations.



Typical Levee Berm, Flood Protection, The Big U, New York, United States, 2013

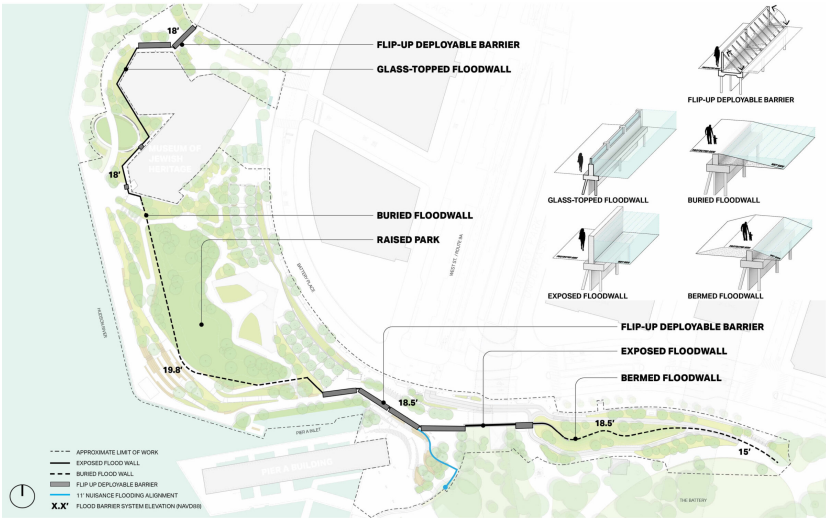


Typical T-Wall, Flood Protection, The Big U, New York, United States, 2013

CASE STUDY 2: Eastern Archipelago

South Battery Park City Resiliency, New York, United States, 2023

This project offers a different approach to protecting coastal cities. Instead of relying on hard barriers, it uses natural layers like raised land, small hills, and green areas. These features help prevent flooding while also creating public spaces for people to enjoy. It shows how cities can be climate-resilient and pleasant to live in at the same time.



Flood Protection System at South Battery Park City Resiliency, New York, United States, 2023

Coastal infrastructure includes a mix of permanent and movable barriers, carefully integrated into the landscape. Key elements include: Flip-up deployable barriers that stay hidden until needed during storm events, Glass-topped floodwalls that maintain views while providing protection, Buried and exposed floodwalls integrated with walkways and open spaces, Bermed floodwalls that blend into green park areas and Raised parkland that acts as a natural buffer to rising water. This layered strategy protects the city from flooding while also preserving public space and visual openness, showing how infrastructure can be both functional and accessible.

CASE STUDY 3: Malay Archipelago

The Tuas Port Reclamation Project, Singapore, 2015

The Malay Archipelago is the largest and most populated group of islands in the world. At the center of this region is Singapore, a small island nation that has built its national identity around becoming independent in managing its water resources. As a small island city-state highly vulnerable to sea-level rise and limited by land scarcity, Singapore has invested heavily in integrated infrastructure systems, such as advanced water management, coastal protection, and green urban planning.

Singapore, Sim Chi Yin/VII, for The New York Times

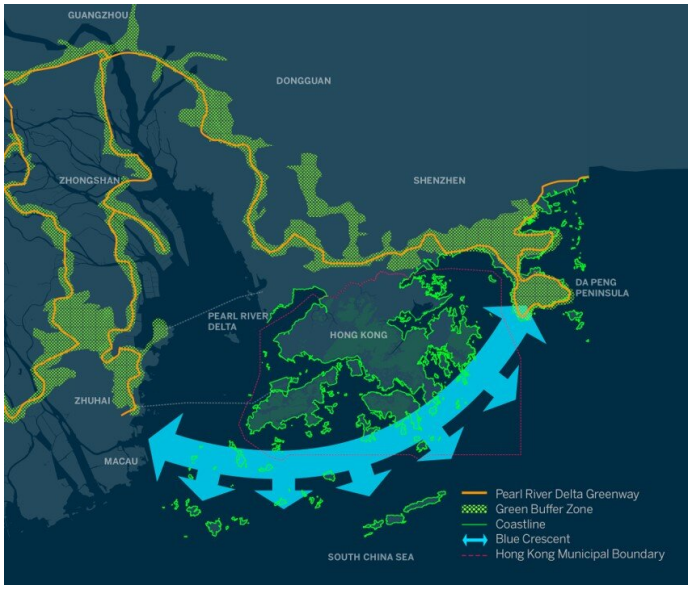
Caissons, or watertight retaining structures, that are part of the project.Credit...Sim Chi Yin/VII, for The New York Times

This show of how a city can function like a well-organized, self-sustaining system—similar to an island in an archipelago—demonstrating how dense, urbanized environments can still be adaptive and resilient in the face of climate change.

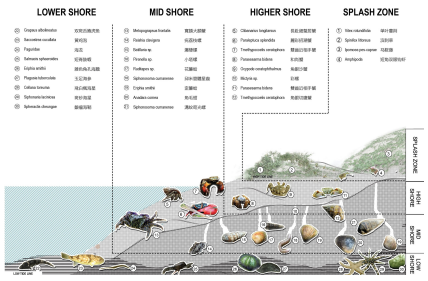
CASE STUDY 4: Hong Kong Archipelago

Cyberport, Hong Kong, 2020

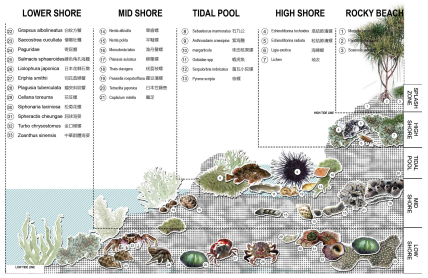
Hong Kong, a dense island city with no inland space to retreat from sea-level rise and intense storms, cities situated along the coast face growing climate threats, such as sea-level rise and intense storms, especially along its coasts. Traditionally, the city's infrastructure has focused on resisting water using hard engineering methods like seawalls.



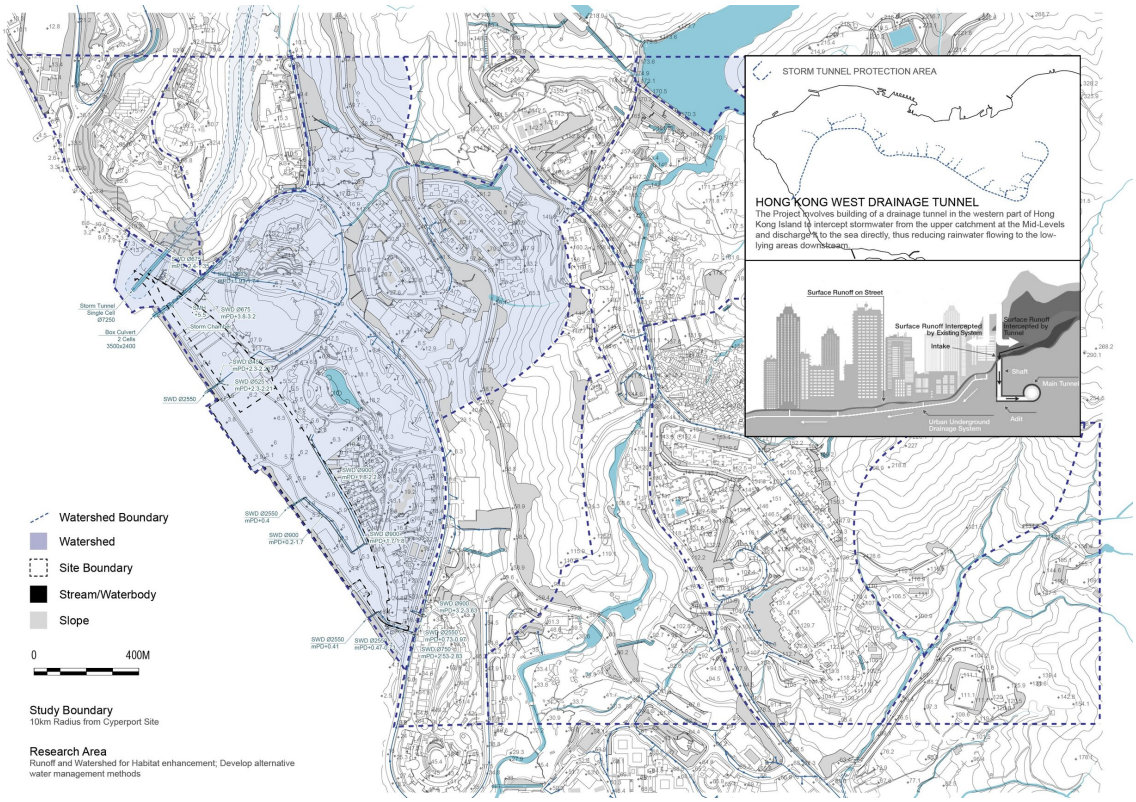
Illustrating of Blue Crescent coastal management zone protections for marine habitats and careful management of fishing, land reclamation, and shipping zones



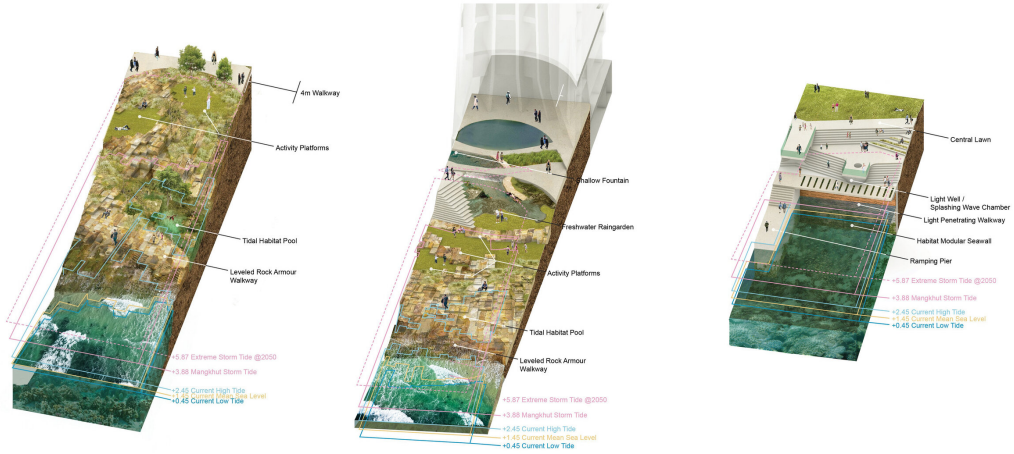
Ecology of Sandy Shore Habitat



Ecology of Sandy Shore Habitat

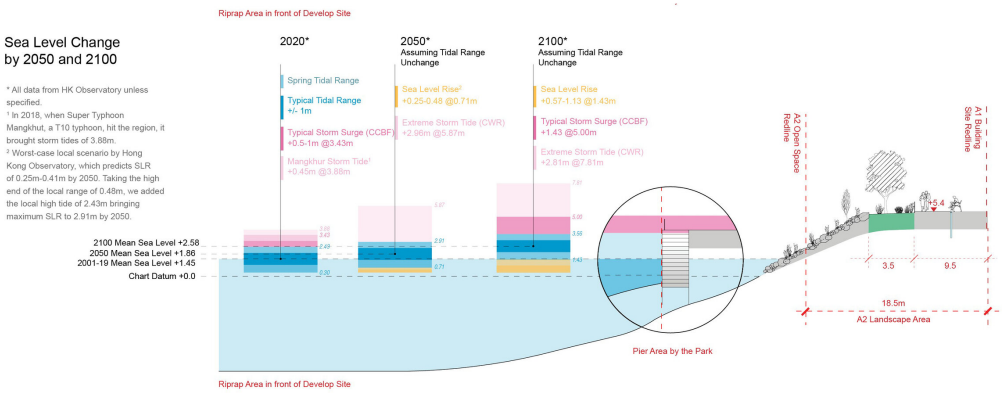


Watershed Analysis and Strom Tunnel Protection Area, Cyberport, 2020



Coastal Infrastructure, Cyberport, 2020

Cyberport is waterfront park where urban and rural areas mix, as examples of where this thinking can take shape. These areas offer a chance to rethink resilience as living with nature, not controlling it. He supports flexible, nature-based solutions that respond to water and help coastal cities like Hong Kong prepare for the future, also strategies are sustainable in the long term.



Sea Level Change by 2050 and 2100, Cyberport, 2

Transcription of Architecture and Design for Society Lecture Series AY 2024

Topic : Archipelagic Infrastructures: A Planetary Perspective
By : David Erdman
From : Center for Climate Adaptation, Pratt Institude
Audio/Video Duration: 01:09:18
Date transcribed : 26 Febuary 2025

Time	Speaker	Audio
00:00:00	MC: Pongpisit Huyakorn	He is one of the founding directors of the institute's Center for Climate Adaptation—please correct me if I'm wrong. This is particularly interesting because, as I was writing and reflecting on what I just saw in that post, I felt the need to delve deeper. I just got back home to gather more thoughts on it. I understand the significance of your points regarding time, investment, and the shifts happening in this sector in the future. Everyone I mentioned earlier touched on politics. The South Sea is closely tied to protection and prevention efforts, particularly in the face of climate change. So, I'm also eager to hear his perspective on that. Additionally, I believe there are many aspects that he, and the projects he will present, can highlight regarding global climate change efforts. So, let's not waste any more time—just sit back, enjoy the lecture, and we look forward to an engaging discussion afterward. Thank you, and have a great evening His, The founding directors of the institute's Center on Climate Adaptation. Right. Sorry if I'm wrong. This is very interesting because what I just saw in that posting, as I'm writing, to get more, I just came back home to get more. I know what that's your points for paying for any, you know, time and changing the sector in the future. All of them I mentioned politics. The South Sea is kind of related to protect and preventing them. It has a future, with the climate change. So I'm also looking for him to see that as well. And this would be a lot of things that Apple said efforts would like to show us about the projects that now related to the climate change of the world. So just don't waste your time. Just, well, and just, hope you have a good evening and enjoy your lecture. And we hope that you can we can have a good discussion after that. Thank you.
00:01:32	Associate Professor David Erdman	Okay. Thank you, everybody, for your patience while we sorted out the technical issues. Thank you, Dean Theriot, for hosting me this evening. And for co-hosting. And thank you, everybody, for coming tonight to hear a little bit about what we're doing at the center for Climate Adaptation at Pratt Institute. Oops. Let's see if this works now. Now, it doesn't want to work.
Kick-off		
00:01:58	Associate Professor David Erdman	There we go. Look at that. The center was started in 2024 after about five years of development. We are a provost center, so I work closely with the deans and chairs at the provost level. We are located in the Brooklyn Navy Yard, which is an active naval facility

		where they still build nuclear submarines. Our building has a green roof, and we occupy the top floor beneath that roof. The building itself is an adaptive reuse space, which really sets the tone for the work we do there. The green roof, operated by Brooklyn Grange, is a key feature. At the center, we host a variety of activities, bringing together the four provost centers and all the research centers within the institute. Films have been shot there, and we've hosted workshops and events, including with Coach. We also have collateral space on Governor's Island and are part of the climate exchange there, which I'll share more about later. Additionally, one of the organizations is currently in residency with us.
00:03:20		So archipelagos are our focus, and there are a few reasons why they are important to our center. These reasons might also resonate with a city like Bangkok or a country like Thailand, or anyone in or adjacent to the Malay Archipelago. The primary reason we focus on them is that all archipelagos face the dual challenges of being water-scarce and land-scarce. Despite receiving a lot of heavy rain, they often don't have the capacity to retain it.
00:03:48		The Intergovernmental Panel on Climate Change (IPCC) has identified four drivers as causing the largest loss of life and human migration by 2050. I would argue that all four of these drivers are related to water, with at least two being directly connected to it. Issues surrounding water safety are not new to North America, but these risks are escalating. We often talk about this environmental risk expanding through to 2100 and even 2200. In the public consciousness, especially in places like New York, there are significant concerns about what the city will look like when rising tides and storm surges hit. This kind of thinking sets the tone for where we are today. I've come across similar depictions of Bangkok that seem quite alarming, showing the potential threats you all face here.
00:04:43		What has changed since the era of resilience 1.0 (the last 25 years) is a heightened awareness and growing concern about rainfall. In New York City, we are witnessing more disruptive events affecting operations, economics, and human health and safety, primarily due to rain events—not just hurricanes. You've experienced some pretty dramatic events of this sort here as well.
00:05:12		This is an image of Hong Kong, taken in September 2023. Hong Kong has the most hardened stormwater infrastructure on the planet, yet this is what happened to it during that storm. It's wild to see. And, of course, flooding like this is something you see regularly in various parts of Bangkok when it rains. And this is important for a couple of reasons. While it's not necessarily a new issue, what is new is the framing and its connection to islands. Up until the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), a nonpartisan international panel of scientists, only the continents were included in the ranking. This changed with the Sixth Assessment Report, where small islands were finally included.
00:06:13		What's striking about this shift is that if you closely examine the data, you might initially think the most stressed areas are on the

		continents. However, this perception arises because until 2022, the focus was primarily on continents. It wasn't until then that experts started looking at islands in the same way—aggregating data to understand the unique challenges and vulnerabilities they face. What's particularly interesting about this shift is that it's on islands that we see what are called 'political or rain events,' events that are closely connected with coastal issues. So, it's very difficult on islands, which are both land and water scarce, to disconnect rain events from coastal events. These events are accelerating more rapidly, making them very interesting areas to study. There are a lot of challenges associated with this, which is shown on the left side of this. However, there are also many opportunities. Islands have historically been well-positioned as pilot areas, as scalable testbeds for new solutions and innovations.
00:07:19		They make up over 50% of the fastest-growing areas on the planet, whether on their own or within municipalities. Based on our estimations, about 1 to 1.5 billion people live on islands globally. So, while some may think islands could disappear, flood, or vanish, these statistics suggest otherwise. Islands account for about 20% of the global GDP and about 15% of the global population, which is quite significant.
00:07:56		And so that sets the basis for what we're looking at at the center for our climate adaptation. Tonight's talk, being in a school of architecture, I thought I'd share a bit of my background in architecture and how I arrived at archipelagos. I'll share a few of our projects, try to make connections to Bangkok and Thailand, and then wrap up with some reflections on what all of this means for higher education.
00:08:25		And I'll try to keep us relatively on time, even though we certainly have a lot to cover. So, my early work was focused on full-scale installations. I was trained during what's called the digital turn. I did a lot of robotic fabrication, collaborating with leading galleries internationally and showcasing projects that we were able to build in various environments. What's interesting about this work is that it all had remote sensing equipment embedded in it. These systems would gather data from emotions, people, lighting, and other inputs, creating a dynamic interaction. Even at this early stage, I think there was a latent interest of mine in microscale infrastructure and how it could interact with architecture—how architecture could absorb and respond to things beyond the traditional building, enclosure, or envelope. That interest grew as I launched our practice in Hong Kong. Over the next decade, I worked globally, living and teaching in Hong Kong during that time. We did a lot of adaptive reuse projects, incorporating new building codes. We also worked on landscapes and standalone buildings. This work started small, but it looked at those relationships between systems—especially mobile systems, scanning, and motion.
00:09:57		Once again, we explored the relationships between various systems, particularly mobile systems, scanning, and motion. This is a large platform installation we created in Hong Kong. Across all

		of these projects, the focus was on how the building could absorb and integrate other data and systems. These systems could influence the building's enclosure or interior, and we looked at how these interactions could relate to the surrounding environment.
00:10:27		So these projects were, in a way, trying to imagine the building pulling the landscape inside. A lot of architecture tends to be centrifugal, reaching out to grab the landscape. But this approach assumes that if you can integrate the landscape into the building itself, it's like sucking in your belly and drawing the landscape in, in these spaces.
00:10:49		A lot of the studies on building enclosures in these areas were focused on that concept. In Hong Kong, we worked on several large-scale projects. In some of these, we were able to create our own ground, allowing us to explore the idea of having both the ground and the towers incorporate water and other infrastructural systems, such as planting, which could be absorbed by the built environment and integrated into other projects.
00:11:15		SIM could shed light and color to activate the surroundings around it, helping to extend beyond the scale of the site itself. These projects involved a lot of hands-on work and experimentation with different scales, including full-scale prototypes. We worked with various client bases, client structures, and building types, each with their own construction logics and systems. But at the core of all of this was infrastructure design.
00:11:44		There was a set of modeling methods that allowed us to study the relationships between different systems. For example, by using mobile technology, we could examine the patterning on the skin and the circulatory systems. This is where my interests in small-scale infrastructures and islands began. You can read more about it in the book The Clever, which I co-authored, where we encapsulate some of that work. I would argue that it also relates to some of my writing.
00:12:17		When I taught at Hong Kong University, I oversaw the lecture series there. This series brought together a combination of artists, product designers, landscape architects, theorists, and architects—people from pretty different backgrounds who hadn't really thought about or discussed each other's fields before. My job as a writer was to develop algorithms, essentially, for writing 1,000-word essays that would bring all of these different people together. And I should, as an example, you can see more of it in the introduction book or in the practice sessions, but I'll just say that the interest here, and I think what's interesting about archipelagos, is that they are almost as exploded as they are cohesive. And it's difficult, even with data, to figure out how they come together. And that was part of the launching point for the center.
00:13:19		We launched our software in 2023 around the second UN Water Conference, and we aspired to bring together as many different archipelagos as we could in our first five years. This is a UN-registered agenda. What's important about this is the goal was to start looking around, finding the archipelagos. You all are kind of in this territory, and build coalitions across different areas.
00:13:51		We have about 25 people in New York, about 50 people globally, and we now have six centers that are in different stages of development. The first three were with Singapore University of

		Technology and Design, Pace University, and then in Chile. Our most recent addition is this all-university partnership, and we have a standing agreement with the government in India.
00:14:19		The idea was to get a good cross-section of disciplines and also get member partners with technical firms like Edith Temple from ER and Arcadis. We aim to use all of that work to begin to approach climate adaptation more aggressively and accelerate what we can do in that space. There are three basic areas that we focus on: climate innovation, entrepreneurship and a new economic life, and climate literacy, which is the educational arm of what we do.
00:14:57		We start in the northeast in the Malay Archipelago, and we're now expanding into the Scandinavian archipelagos to the northeast. The system of barrier islands and archipelagos that stretches from Virginia to Maine is a key area of focus. As I mentioned earlier, we're mostly working on Governor's Island here in New York. In 2023, we won the New York Climate Exchange, which was part of what helped launch my center
00:15:23		That's a partnership with the State University of New York, and it's the first of its kind. Located just across from Wall Street, this initiative will bring together 12 universities and various industries to think about how to adapt in the future, year by year, and beyond. The island itself is quite interesting because almost half of it is devoted to new developments, all built on reclaimed land—around 4.5 million square feet. This island, like others in the archipelago, is very much under threat from rising sea levels, has no arterial connections, and presents a variety of issues. I'll share more on that later. The Malay Archipelago is our home base in Singapore. We're working to spread our efforts around, focusing mostly on the East coast of Singapore. Changi is here, Marina Bay is here. We're also expanding into Hong Kong, and there's a long-term project on the East coast—another coastal defense project in a consortium. It's not to be confused with Long Island, New York, but this is a large-scale coastal defense initiative aimed at creating a reservoir that will protect Singapore from rising tides. This will be one of the largest reservoirs in the region, with an 18-year development plan. It's a crucial project, especially for the back Bay area, and one of the renderings of this project allows us to merge political and coastal concerns in innovative ways. We're also working on projects in Patagonia, focusing on the sea and the challenges it poses in those regions."
00:17:22		So this is our largest and northernmost island, Patagonia. Chile makes up about a third of our archipelago, and the Patagonia island, part of the Latin archipelago, has about 250,000 inhabitants and around a dozen states. It's the most rural archipelago we're working in, with lots of potential for development. There's a new bridge, a new airport, and a freeway along the riverside. The archipelago relies heavily on its agricultural and fishing industries, but there's a significant issue here: cities in the area contribute the equivalent of New York City's nitrogen waste discharges into the archipelago every day, placing a heavy burden on the environment.
00:17:55		Additionally, the region is water-scarce, and communities live on the water, showcasing reclamation and dwelling forms you might find in Southeast Asia. What's unique about the area is its tidal

		variation, with about 6 to 8 meters of tidal shift per day, making it one of the most dynamic and interesting places to study.
00:18:52		Moving north, we're also working with the Finnish Archipelago, historically involved with the Belt and Road Initiative. This collaboration looks at urbanization and transit issues, especially as the Arctic thaws. The northern part plays a crucial role in connecting the EU, North America, and Russia, influencing transit and urbanization patterns in the region.
00:19:23		In our work, we use both traditional methods and contemporary approaches. Some of the traditional methods include sketching and collage, while we also employ artificial intelligence for rapid iterations. We aren't providing final solutions; instead, we use these methods to quickly test out different scenarios, like extreme retreat versus living on top of a seawall. This approach allows us to explore variations in a fast, iterative manner, which aligns well with architectural training.
00:20:01		We combine this with building analysis and envisioning. Traditionally, architecture students and designers work in the urban arena, but we're now expanding to include buildings that integrate nature-based systems, like water-filtering structures. We also use mapping techniques for entire archipelagos, sections for islands, and navigation patterns, pulling together various scales of data. For infrastructure design, we adopt a cinematic approach, blending live footage, mapping, and technical information at different scales. For medium-scale infrastructure, the work becomes even more complex, combining realistic footage, sections, and more technical mapping techniques to visualize how architecture and infrastructure can coexist and support each other.
00:22:49		This is not that different from the building process on campus here. And then at the scale of the full archipelagos, we mix it up a little bit by bringing together architectural techniques, more traditional mapping, and live footage techniques. Across all of these projects, we try to hit five key points. Generally, what we're suggesting is that islands should not be off-grid.
00:23:17		A lot of them are interdependent on dams or other systems to feed them. We're suggesting it should be complementary, that they should be working toward better resourcing and net-zero water. And as much as we look at flood disaster, we should also look at resource management. So how can we use cloudbursts or community aggregation to build resources? Those could be emergency resources.
00:23:45		Those could be positive resources. And at every touchpoint, try to understand how that scales. I'll briefly share two projects at very different scales, that we did for New York City and one in Hong Kong. Since it's close to here, this is looking at rebuilding a building from the inside out. So typically in climate projects in architecture, it's typically the skin that does a lot of the performance here.
00:24:15		We are focused on "rebooting" the cores, which are the white masses within the existing buildings. These cores are clearly defined, and we aim to reconstruct them using on-site robotics. The process involves cutting into the building for a retrofit, and we've found that on-site robotics offer advantages over prefabrication. This project presents numerous interesting

		challenges, especially considering that all of the buildings involved are historically landmarked.
00:24:43		The challenge lies in identifying which areas you can modify and which ones you cannot, especially when dealing with an outdated system of distributed, toxic energy. Our goal is to transform that system into one that centralizes cleaner energy. Additionally, there's the complexity of construction logistics—reworking a building from the inside out, cutting it open, and then working towards the perimeter. I refer to this process as the "filace in the future.
00:25:11		The filaces were a significant innovation in the mid-1800s, playing a key role in bringing energy to buildings. This concept is now being applied to water systems, with a large rain tank positioned in the center of the building. It's robotically fabricated to serve all the wet walls and water reuse infrastructure. What's crucial about this shift is that it transforms buildings from being inert, as seen at the top, to becoming more absorbent, as seen at the bottom.
00:25:37		What we're aiming to achieve at every scale is to integrate buildings into the watershed, making them part of the larger system. In the U.S., this often involves public-private partnerships. At the smallest scale, individual homeowners might be involved, with the larger community's support potentially triggering grants from the city. This, in turn, could lead to the development of public spaces and generate offsets for emergencies or even reliable water supplies.
00:26:13		Much of the work in resilience 1.0 and 2.0 has focused on public greenspaces, assuming cities can afford to continue building their own infrastructure. However, this new approach assumes they cannot. It emphasizes the need for small-scale, fragmented private investments to help bridge the gap and move us closer to achieving the Sustainable Development Goals, as we are significantly behind.
00:26:39		To ensure scalability, we start at a smaller scale, then expand to a district level across a larger area, integrating rainwater, resource, and flood management. The second project I'll briefly mention is a large-scale waterfront park on the south side of Hong Kong. This park already exists, as does the office park behind it, both built on reclaimed land.
00:27:07		This project involved the renovation of the park and, in addition, the integration of new office infrastructure. For those unfamiliar with the Hong Kong archipelago, it consists of about 256 islands. This specific area is called the Blue Crescent and is ecologically sensitive. Historically, development in Hong Kong has focused on the northern shore of the island.
00:27:33		The southern, eastern, and western parts of the island are now being studied, including the area of our focus, the Cyberport organization, which is part of the city. What's interesting about these shorelines is that many of the urban villages still hold land rights for activities like fishing, swimming, and utilizing these shorelines.
00:27:55		These shorelines are toxic and extremely hazardous during flash floods, yet they are also visually stunning and captivating. Our task in this study was to find a way to protect the community and preserve their connection to the shoreline despite rising tides and various vulnerabilities. We presented them with ways the area is currently used, along with suggestions for sustainable alternatives.

		However, we emphasized that activities like swimming near a combined sewer outlet are unsafe and need to be reimagined.
00:28:28		We mapped the existing seawall structures along the shoreline, examined potential new ones, and assessed their impact on non-human habitats. Our proposal involved integrating mixed systems, combining both green and blue infrastructure. As with some of the earlier work I shared, this approach also incorporates engineered solutions, so it's not purely green or blue but a combination of both to address the challenges.
00:28:53		It's not just gray; the project will integrate a blend of gray, blue, and green elements. The goal is to bring these variables together cohesively. This design captures high-velocity water flowing from the peak, reusing it efficiently. Additionally, it carves out reclaimed land to store and recharge coastal habitats while also filtering more water in the process.
00:29:24		The design elevates all the public programs to the fourth floor, using a series of terraces and a mass timber building skin that acts as a filtration system for the landscape. The idea is to coil everything vertically to maximize capacity in the space. Echoes of this approach are reflected in our study, which served to inform the final project, showcasing the elevated terraces.
00:29:55		At this point, I'll provide an overview and touch on some connections to Bangkok. As a center, we're focused not only on islands but also on the broader concept of "islanding." While our primary concentration is on archipelagos, the idea of islanding—especially as a strategy against climate change, as seen by the US military—isn't entirely new. It's interesting to explore the metrics they lay out to address climate change and how they relate to this concept.
00:30:30		A lot of it revolves around microgrids and water management. It's essentially a way of re-envisioning the concept of carrying capacity. For those of you studying landscape architecture or with a background in ecology or urban ecology, you'll know that carrying capacity refers to creating a habitat capable of sustaining both human and non-human species.
00:30:54		Instead of retreat, we're seeing a shift because economic drivers often require pathways that not only address capacity but also allow for economic development. This leads to a distortion of that term. Additionally, we suggest that innovation doesn't necessarily mean creating something new. While we use a lot of technology, if you look at the definition of architectural innovation, nowhere in it does it mention "new stuff."
00:31:26		It simply means you're rearranging existing elements. The project in the background reflects that society in Hong Kong is only about 30% new construction; the rest is focused on landscape and building preservation. It's a blend of landscape architecture and urban design. I would argue that none of your careers will likely be purely about architecture alone. Instead, there will likely be a combination of conservation, preservation, landscape, and urban design.
00:31:57		And Hong Kong has a lot of this. You need to figure out how to work with it. What we're suggesting is that it should be treated as a resource, not something borrowed from elsewhere. We need to start believing in and collaborating on how we can harness water and nature-based systems effectively.

00:32:17		All of this represents a very different attitude toward islands. Historically, islands haven't been seen as valuable unless you add land to them, a mindset that's been prevalent since the early 1900s. This was the case in New York City. The economics behind this are quite real—it's often cheaper to import land from other areas and then charge higher prices for real estate on an island.
00:32:42		The same pattern can be seen in Singapore. For many decades, even centuries, islands have been forced to function like land, with their economics driven by that approach. We're suggesting that there might be other ways to unlock value—by including the built landscape within the economy of resources. This also ties into how we borrow water again, with archipelagos functioning as both landscapes and water systems.
00:33:10		There are very few archipelagos that can supply their own water. Singapore is the blue-chip model, but it's still 50% water dependent. New York City, on the other hand, is 0% dependent, as we own all of our reservoirs upstate. However, none of this water comes from the archipelago itself, which is a significant issue. This sets up some interesting geopolitics. For instance, in Singapore, they rely on borrowing 50% of their water from Malaysia.
00:33:39		The water lease that Singapore has with Malaysia will run out in 2060, and despite receiving a lot of rain, much of it runs off, leaving the region vulnerable to drought. These issues are common across various archipelagos. So, the question becomes: how can we connect the dots between the challenges I'm sharing from New York and these other islands facing similar issues?
00:34:03		How can we learn from each other and collaborate? That's why I came here today—to share some observations and give you a glimpse of what we're doing. For those of you who aren't aware, New York City is currently working on one of the largest coastal defense projects, and our researchers are heavily involved in it.
00:34:22		Arcadis is part of our team on this project. Some parts have already been built, while others are still in design development or under construction. I sit on advisory committees for these projects. This image shows the East Coast of New York, with the West Coast nearly finished. The East Coast is about to be built. There are different lessons learned from each, with more advanced seawalls in some areas.
00:34:45		Some of these structures are hydraulically elevated, utilizing new construction methods like geofoam instead of traditional dirt or sand for areas being re-contoured. There are many lessons drawn from the surrounding islands. For example, if you look throughout the New York City archipelago, you'll see the integration of nature-based systems, such as berms on Governor's Island.
00:35:11		That's all part of afforestation. In Long Island City, there are spreading grounds that serve as recharge basins, cleaning and purifying water. These are new hybrid blue-green-gray structures, with even artificial systems emerging for inter-pier habitats in New York City. This shift is significant because the Army Corps of Engineers, our national organization focused on coastal defense, is traditionally accustomed to hardened gray systems.
00:35:44		They know these systems won't cause harm and that they can be insured, so that's the baseline. There's a large plan and proposal in place, set to be implemented by 2030, to build more defense systems throughout the tri-state area, called the Harbors and

		Tributaries project. This is the focus for New York right now, and it's a key part of what we're examining.
00:36:09		Coupled with that, there's a growing interest in integrating nature-based systems into these solutions. However, for the Army Corps of Engineers, nature-based systems are not considered structural. They are viewed as decorative, primarily for habitat restoration, but not for defending human lives. This presents a significant area of research if we want to move toward incorporating these systems in a more capacity-driven way.
00:36:36		What is the capacity of these systems in both urban and rural settings? There's similar progress being made with rainwater management. We've developed regulations that help retain more water. In New York City, cloudburst programs are already utilizing parks and public spaces to store water. However, we recognize that completely overhauling our plumbing system would cost billions of dollars, so we're focusing on alternative, more accessible solutions.
00:37:02		So, that's not the ultimate solution, but it's the pathway we've been on so far. Using all the parks will only cover about 14% of New York City's water demand. To truly scale up and accelerate these efforts, buildings will need to become part of the watershed. By 2066, 66% of the total rainwater demand in cities like New York and Boston will need to be captured from rooftops and other surfaces to make a significant impact.
00:37:40		This is important to us because we're losing a significant amount of water in the region. As I mentioned earlier, if you look at the past century, you'll see that the Great Plains, the West Coast, and the Southwest have often been associated with droughts. However, New York City is now considered one of the hot spots due to its status as an archipelago. We've already witnessed wildfires this year, which further emphasizes the growing risks.
00:38:00		We've been experiencing smoke from these wildfires for the past five years. According to a Cornell study, the river valley is one of the fastest-growing areas affected by climate change in all of North America. The evidence is clear: we're seeing recurring droughts throughout our watershed on a regular basis, and salinity levels are rising in the region, making the watershed more toxic.
00:38:28		Pathways toward achieving net-zero water and integrating coastal rainwater are now on the radar. This is part of our Resource New York study, which I shared the stats from earlier. However, this will require more data points. Currently, we have a very basic and limited sensing system in New York City, with only about 200 sensors installed to monitor flooding.
00:38:54		Singapore has a very advanced system, and Helsinki also has a pretty good one. What we're focusing on is digital twins, which represent another level of AI application. This technology is used for vehicles, buildings, and transit systems. It allows us, during the design phase, to understand how urban interventions might perform in terms of capacity.
00:39:19		This is like BIM modeling on steroids. What's important for you to think about is that this has now entered the climate space, but most of the focus is still on carbon. The current conversation around digital twinning is almost entirely centered on energy, as companies like Pencils Block Power have demonstrated. However, very little attention is being paid to water or nature-based systems.

00:39:49		These are areas we believe are ripe for study and would greatly benefit from digital twins as we progress further into the 21st century. Now, how does this connect back to Thailand or Bangkok? Southeast Asia, where Thailand is located, is technically adjacent to the Malay Archipelago. In a broader sense, your archipelago could be considered part of that, along with places like Taiwan and Hong Kong.
00:40:17		Even within your national definition, understanding the impact of islands within Thailand is somewhat unclear. There are three general regions identified as having a high concentration of islands, but Thailand actually has over 1,400 islands—far more than the 20 most popular ones that tourists visit. This is just a glimpse of the first couple of hundred of them.
00:40:47		There is a lot of complexity here. Some of these islands are located along borders, and the geology of these areas is both compelling and interesting. This is the bay, which many of you may recognize, known for its karst formations. The economics of these regions are significant—based on my own estimates, which I gathered in preparation for the upcoming year, islands contribute around 10 to 12% of Thailand's GDP. A large portion of this is driven by growth in the service sector, which is now Thailand's primary industry and expected to continue rising. Additionally, depending on where and when you look at them, islands seem to be quite significant in various regions.
00:41:30		Performers in that landscape, such as other flood-vulnerable areas like Bangkok, highlight the importance of understanding the dynamics of archipelagos and how they can function at a larger scale. The Malay Archipelago, along with smaller archipelagos within Thailand, presents a rich subject for discussion. Your government is already focused on sustainable island tourism, and there are royal initiatives promoting island sustainability. These efforts are crucial in balancing ecological preservation with economic development, ensuring a harmonious relationship between the islands and the communities that depend on them.
00:42:02		But I assume that when most of you think about flooding and threats, you're focusing on this area. However, at the top here, you're likely thinking about Bangkok, because that is the area where concerns are most prominent in terms of its future by 2100. The operability and livability of an urban region like Bangkok are facing significant challenges, especially with the increasingly intense droughts that are becoming more frequent.
00:42:25		The impacts might be a bit more intense on the islands, but they extend throughout the region. This acceleration, shown in data from 2018, highlights that you're borrowing a lot of water from other areas to make things work. While there are diversionary and infrastructural tactics to bring water in, aside from sourcing landscapes, as far as I know, there isn't a substantial water reuse program in place. It could be an area worth researching and assessing more aggressively moving forward.
00:42:57		There are clearly some emerging plans for coastal defense, and in the past couple of years, some of them have been more ambitious than others. Your former prime minister and his party have been coming up with some pretty bold ideas for coastal defense off the coast of Bangkok. One of the major drivers of these plans, it seems, could be the Belt and Road Initiative.

00:43:24		You are part of the Belt and Road Initiative, within an economic development zone. It seems that you're starting to see the benefits of that development, which are largely centered around rail infrastructure, in addition to the existing and planned maritime routes. This is likely to have a significant impact on your region, and it already appears to be transforming some aspects of your economy.
00:43:51		So, thinking more along these lines, it's clear that we're moving in the right direction. A big shoutout to the land process—it's essential in getting these projects off the ground. These are incredible initiatives led by universities and firms here. There are also some interesting, more recent examples, such as the transformation of the old tobacco factory, which has turned into something new and innovative.
00:44:21		These are fantastic projects, but most of the water being raised in them is being reused in the landscape. It's not yet at the point where water is being reused or integrated into the buildings themselves, which could be an interesting subject to explore further. To wrap up, here are a few observations on how all of this fits into the broader landscape of higher education.
00:44:47		What's important to understand is that we are very behind in the area of water management in archipelagos. We know how critical it is to accelerate progress in this area. The first water conference, held by the United Nations, took place in 1972 in Stockholm—this was the first time the UN turned its attention to water issues after World War II. The major players in this field are Stockholm, Singapore, Japan, and Greece—all of them are archipelagos.
00:45:15		There are cautionary tales from this meeting, such as running out of water and the planet heating up. These issues prompt a lot of excitement among architects, designers, and scientists about what's happening. Then, in 1973, just a year later, we run out of gas, and everyone freaks out, shifting their focus to carbon.
00:45:41		All the scientists start forming an intergovernmental panel. A decade later, the seeds of the Sustainable Development Goals (SDGs) are mostly focused on heat and energy. This is really important stuff, and it will affect human lives. But what you need to be reminded of is that it won't affect them as quickly as water. This is why, mostly, the SDGs are failing.
00:46:10		The SDGs were launched in 2015, and they're an outcome of the IPCC, the Intergovernmental Panel on Climate Change, which started around the same time. What's interesting—and shocking—is that they are failing, especially when it comes to water. Water is failing pretty badly within this landscape. A lot of the discussion focuses on the top two tiers: economics and society.
00:46:39		Those are the entry points, but I think this diagram effectively highlights the foundational importance of green and blue infrastructures that must support the entire system. You can't address the top two without first focusing on the bottom four. That's the key lesson this diagram is trying to convey. Unfortunately, many architecture schools are still focused on just the top two.
00:47:02		Landscape architects arguably work more with water, while we tend to focus on new sites, buildings, technology, materials, and the reuse of materials. This approach makes some progress, but it's not enough. While this work will remain important later, water issues are urgent today. One way we've been encouraging

		universities to step out of their comfort zones is by getting students and faculty involved in larger, real-world events.
00:47:37		The first time we implemented this approach was at the U.N. Water Conference in 2023, which was only the second U.N. water conference—held 50 years after the first one in 1972. In that time, there have been over a dozen environmental conferences, yet it took half a century for the U.N. to return to the issue of water. This delay reflects a growing realization that water is a critical and urgent problem.
00:48:01		This initiative included a high-level panel at the U.N., a symposium on the main campus, and a workshop at our space. These formats provided opportunities for students and faculty to engage directly with community leadership, fostering discussions with professionals from around the world—including landscape architects, architects, and other experts. The goal was to brainstorm, exchange ideas, and explore diverse approaches to addressing these critical issues.
00:48:28		They look something like this—the language many of you are likely familiar with when setting processes in motion. However, I would argue that this alone is not enough for effectively communicating with policymakers or communities. While we understand these abstractions as part of analyzing plans, it's not until they see a visual representation—showing, for instance, how many blocks would need to be relocated for a more rigid system versus a softer alternative—that they truly begin to grasp the real impact of these decisions.
00:49:10		And I can assist with that. If nothing else, it helps position you in front of thought leaders, world leaders, and community leaders, allowing you to start making these arguments. We've now organized four of these initiatives. The second one focuses on Singapore, specifically examining the East Coast and Long Island. The third is the longest and most extensive yet.
00:49:34		This is a 2,0500-kilometer expedition, where we are set to traverse nearly the entire Patagonian archipelago from the northeast to the south, reaching this point here. Students join us in this journey, collaborating with a pest control tower, developing land-use proposals, surveying the landscape, and identifying key critical components in the region.
00:50:11		And even with community leaders, as we move further south, the most recent expedition—the fourth one—took place around Singapore National Water Week this past summer. This event successfully brought together all of our centers, creating a strong collaborative program. Cox and Tom were both involved, and, once again, we engaged students from multiple universities and countries, along with faculty from those regions.
00:50:35		Next, working with the U.S. Army Corps of Engineers, Singapore's Public Utilities Board, and engineering firms, we engage in live, hands-on problem-solving—getting into the thick of it to identify key challenges. Some may call these efforts messy, but we find value in using these structures, which are, in reality, quite complex events. In New York, every fall, we organize something around the High-Level Summit on Wilding.
00:51:06		These are a few exhibitions where we showcase the work we've been doing around the world. This past year, we collaborated with Slam on an exhibition called A Tale of Two Islands, which explored Roosevelt Island and Governors Island. We also worked with

		Foster + Partners, revisiting their 1975 proposal for the Canary Islands, which aimed to bring water into the region.
00:51:29		They recently pulled this project out of the archives and, in recent years, incorporated it into a multi-year master plan that was just launched in 2024. Our work also involves various forms of art, artists, and performance. We strive to highlight different areas and conduct extensive outreach to connect international and local agencies.
00:51:55		We organize various tours and had around 6,000 visitors on the island this past year. We're also expanding our repertoire of workshops, bringing in people from around the world, including Taiwan, London, and other places. Additionally, we're collaborating with both local and international government agencies on issues related to water reuse and water independence.
00:52:26		I talk about this because I understand it, but even when it comes to the island, I don't think it's easy to fully grasp. I'm not a huge fan of just keeping students and faculty in the classroom to engage with these communities. While the studio model is valuable, we really need to challenge educational environments to go beyond the traditional setting and get out into the field.
00:52:49		If we're truly going to take the idea of carrying capacity seriously, we should be going to these places to understand what these environments can offer and how they function. I hope this gives you a sense of what we're working on. Thank you for your time and patience today.
Q & A		
00:53:20	Associate Professor David Erdman	Do we have time for taking questions or are we too far?
00:53:25	MC: Pongpisit Huyakorn	Yeah, I think we have time. I will take a few questions and that is alright.
00:53:48	Audience 1	Thank you for being here today. I am truly impressed by everything that has been shared, and I feel very proud. I have been involved in design as soon as I had the opportunity, making sure to take action as quickly as possible. So, while I may not have much to add at the moment, I am happy to be part of this discussion. I also appreciate the opportunities I have had to work in this field. When I was a student, I learned so much, and as I mentioned, we are also working on something related to this. A lot of it is centered around education and schools. From a business perspective, I am curious about how business models can tap into something more inherent, something deeply connected to a place or community. Especially when considering the broader system, like a colony itself. I suppose this is not really a question, but rather a thought I wanted to share. I would love to continue this conversation later and discuss how design is shaping leadership, perhaps in the way Goldman envisions. At the same time, I completely agree. We have done so much work around sustainability and climate change, but there is also the business side of it all. If you and I can connect, I would love to discuss this further.

00:55:16	Associate Professor David Erdman	I am happy to share that our senior advisor, who serves as the executive director for global commercial economics of water, works closely with leaders such as President Macron of France, President Obama, and officials in Singapore. Recently, they released their first report, which is a groundbreaking attempt to assess the global impact of water services on economic operations and national economies. I encourage you all to take a look at it. His work has been instrumental in shaping our center, which is why we partnered with his university. At our center, we collaborate with environmental law and business programs, ensuring that finance is integrated into everything we do. Unlike traditional approaches that often separate architecture from business, we encourage architecture students to consider financial viability in their projects. Earlier today, we saw graphs showing how students are required to make a financial case for water storage, even if it involves speculative ideas that current policies do not yet support. However, part of the challenge is identifying potential policies—whether within their own cities, similar urban contexts, or archipelagos—that could drive these initiatives forward. It is essential to incorporate finance into design discussions. Design cannot be seen as separate from economic realities. When I graduated, there was an assumption that someone else would secure funding for our projects. That is no longer the case. If you do not have a financial strategy, your project may never move forward. You may not need to be an expert, but just as architects and landscape architects must understand structural systems or hydrology, this generation must also grasp finance. Working with entrepreneurs and business leaders is now a crucial part of the design process. Finance cannot remain outside the studio as it has for decades. It needs to be integrated early, during the design phase, so you develop the skills necessary to navigate financial challenges in your future career. Understanding the economics of your projects will be just as important as their design.
00:57:58	MC: Pongpisit Huyakorn	Would anyone like to ask a question?
00:58:06	Audience 2	Thank you. I appreciate the insightful presentation on infrastructures. Are you suggesting a shift towards customized infrastructures, moving from government-led initiatives to more community-driven approaches, where smaller, localized infrastructures become more common?
00:58:48	Associate Professor David Erdman	Oh, no. If you're an elected official, the funding doesn't necessarily come directly from the people. Instead, it often comes from those investing in your city. You can incentivize them to invest and develop infrastructure in a way that benefits the public. Historically, intergovernmental banks like the Asian Development Bank or the World Bank provided loans to governments for large-scale, centralized infrastructure projects. But many of these projects are now outdated, and most governments have already maxed out their debt capacity. While I can't speak for Thailand

		specifically, in the U.S., for example, there's no access to funds from intergovernmental banks. This leaves elected officials with limited options. The traditional way to fund public infrastructure is through taxation, meaning higher costs for citizens. So the key question is: What are the alternatives? How do we finance infrastructure without increasing taxes? The most likely answer is private investment and development, leading to mixed funding models. Public-private partnerships (PPPs) are becoming more common. Major financial institutions, such as Standard Chartered and the International Finance Corporation (IFC), the private arm of the World Bank, are exploring blended finance models. These approaches shift away from fully centralized systems. Unlike power infrastructure, which can be more easily centralized, water infrastructure is more challenging due to gravity and the costs of pumping. This is why decentralized, 'patchy' infrastructure isn't necessarily a bad thing. The goal is to create multiple smaller systems that can eventually be interconnected. Singapore has successfully centralized its water system, but even with its wealth and small size, it has reached its financial limits. Few other countries can afford to take that approach today. Take California as an example—they recently built a new desalination plant in Los Angeles, but they had to pass a bond, which is essentially a government loan, to fund it. To avoid this reliance on public debt, alternative financing strategies must be explored. This is where politics and economics intersect—finding revenue sources that don't place the financial burden directly on taxpayers is critical. Without this shift, infrastructure development will continue to lag. Of course, there are risks. But these new models need to be tested and researched. Higher education institutions must broaden their scope beyond just public and centralized infrastructure. They need to engage with major investors, private sector partners, and economic incentives to develop decentralized, adaptable infrastructure solutions. There are already companies working on this—remote sensing firms, for example, are developing sensors that can collect data from buildings and connect them into citywide networks. This is the future of infrastructure—more decentralized, more efficient, and ideally, less reliant on taxpayer funding. That said, it's not a guaranteed success. There are concerns, and potential for misuse exists. However, with responsible early adopters, strong financial oversight, and high-quality monitoring systems, these models can be made to work effectively
01:02:59	Audience 3	I'd like to ask about solving the climate change issue. In places like Bangkok, even a small issue can become a huge problem. But we don't always have the means to address everything. We need to build smart cities, but I'm curious to hear your thoughts on this. How can we approach these problems without relying too much on external parties or unsustainable solutions?

01:03:33	Associate Professor David Erdman	Well, you know, we have discussed this in conferences and workshops. I think we need to come together. There are some good examples of landscapes starting to behave like buildings. Take Centennial Park, for instance. Is it a building or a landscape? You tell me. It's probably a bit more landscape than building in terms of how it feels. But it's a privileged, low-lying, open space that a campus can afford. Can you replicate that in the Central District of Bangkok? Probably not. So, as all the buildings go online in downtown, you need to increase investment in that area and make it as dense as possible. This calls for more vertical models. It was interesting to learn, during our tour of Centennial Park, that the two towers next door, which involve land processes, will have a connection vertically to the landscape. Those types of experiments are really important in setting the stage for the future. But it means architecture needs to incorporate more landscape, though that doesn't necessarily mean horizontal. I think there are false binaries when it comes to coastal defense and rainwater management, where blue-green systems are typically thought of as horizontal, and hard, gray systems as vertical. One area where we can make a difference is by breaking down those false binaries and considering how vertical systems can also be green and blue. Additionally, if you're going to bring water into a building in the U.S., you typically don't want to capture it from the ground, as it can contain toxins and heavy metals. The best place to capture water is from a roof that people don't access, as it's much cleaner. From there, you bring it down through pipes and use the water to generate electricity, pump it back up, and filter it through the building. Vertical buildings can contribute a lot. The study I showed for New York suggests that we could potentially satisfy 66% of the demand for gray water using roofs and facades in that kind of configuration. But it requires believing that buildings can become part of the watershed. The financial aspect of this is tricky, and I could speak at length about that. It would mean taking away floor space from developers to add water systems to the building. For example, this room probably has pipes and water running through it, likely coming off the roof above us. We're talking about adding capacity, which will take up more space. So there needs to be financial incentives to make that work and design solutions to figure out how to achieve that. But in short, roofs, facades, and grounds are quick ways to bring together vertical landscapes, and I think we could play a role in that. Now, one more question. If the water doesn't come from the ground but instead from the roof, even though it's rainwater, it's still not clean because it touches the low-lying ground. In North America, that water wouldn't meet public health standards for use

		in a toilet because there's concern that a baby might drink it and it could contain heavy metals. That's no different from coastal water. You can recharge those systems and filter them, as Centennial Park does, to use the water for other purposes. However, it's more difficult to get that water into a building. Very tall roofs in a building, though, are a viable source for bringing water in, so buildings can collaborate with traditional groundscapes. That's why the water at Centennial Park doesn't go into the building's toilets. I'm guessing it's a public health safety code issue—though that water isn't from the coast, which could be even more toxic, it's still problematic once it hits the ground because it collects toxins that need to be cleaned. There's a lot of discussion around this, but you can still increase capacity with doubled-up systems. Even the building with land processes, as shared with us earlier, has two systems: one for the building and one that returns water to the landscape. These systems take up more space, but that's where clever design comes into play. Does that answer your question?
01:08:16	MC: Pongpisit Huyakorn	Okay. Let's take a step back and reflect. That wraps up the Q&A. Thank you so much, Associate Professor David Erdman, for your insightful and very valuable lecture. I think it fits really well with the theme of the lecture series, Architecture and Design for Society. Let's give him one more round of applause.