جامعة قطر
QATAR UNIVERSITY

مؤتمر ومعرض الهندسة الخضراء
جمعية المهندسين القطرية
Qatar Society of Engineers
Green Engineering Conference & Exhibition

**Green Engineering Conference**
Monday, 23 April 2018

Buildings Don't Bounce

The Design Paradox of Urban Resilience

Dr. Mark David Major, AICP, CNU-A and Sultana Faraj SF Al-Nabet
Department of Architecture and Urban Planning, College of Engineering

Aerial View of Rome, Italy (Image: Wikipedia)

QATAR UNIVERSITY

- Theoretical contradiction at the heart of debates about urban resilience for practitioners and researchers of the built environment

- By definition, a sustainable city <u>must</u> be resilient and *vice versa*

- Conceptual ground-clearing exercise necessary to bring scientific rigor to research that better unites issues of urban resilience and sustainability

- Why have some of the oldest, continuously inhabited cities in the world endured as dynamic urban systems?

- By shifting the focus of urban resilience research, humanistic design should emerge as a key variable in our most resilient, sustainable cities.
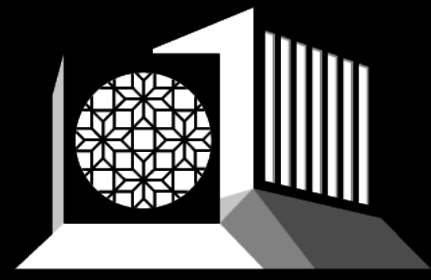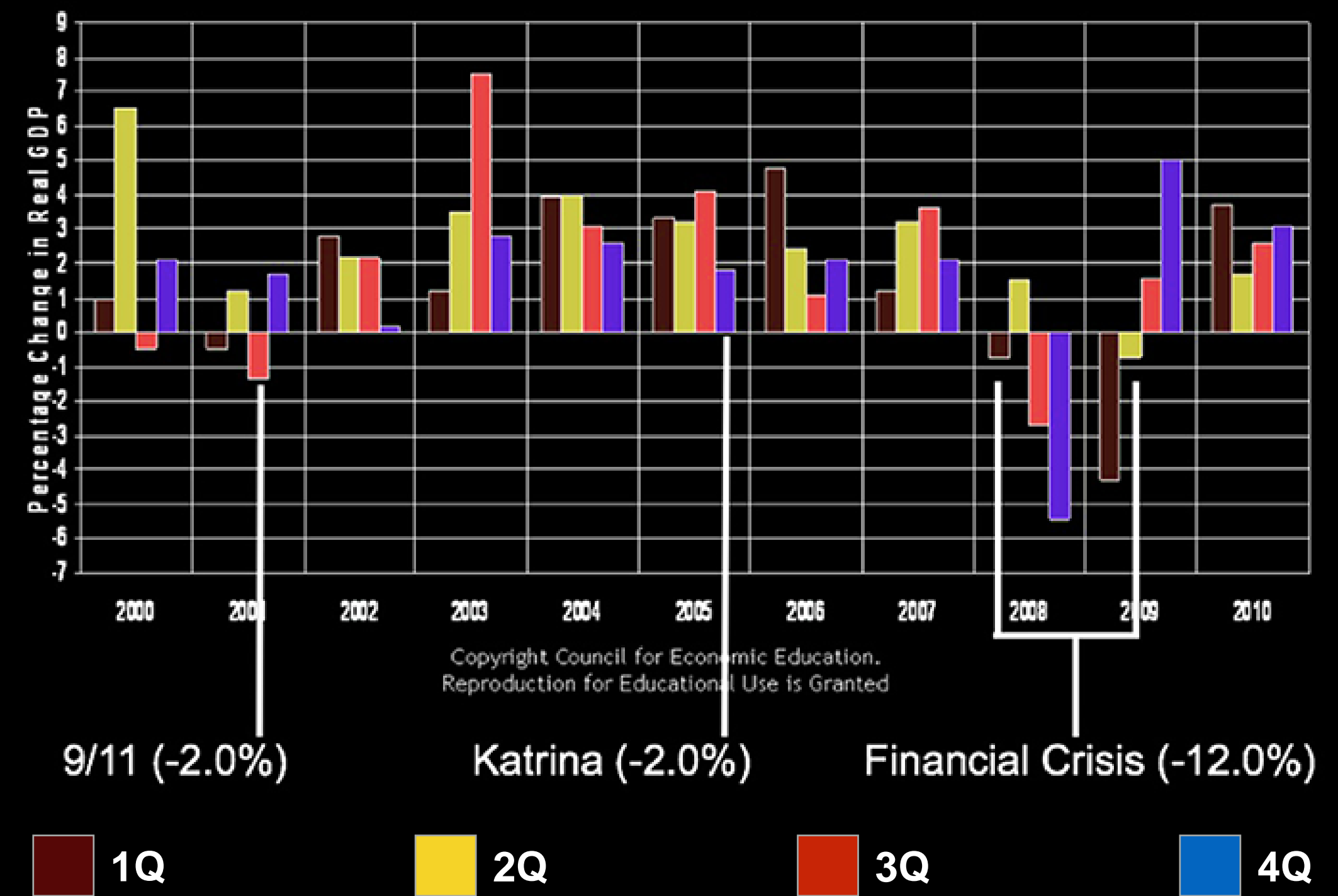
Origins of Urban Resilience

Table 1: Estimated cost of 11 September 2001 attacks and Hurricane Katrina in fatalities, property damage, and approximate loss of U.S. Gross Domestic Product (GDP).
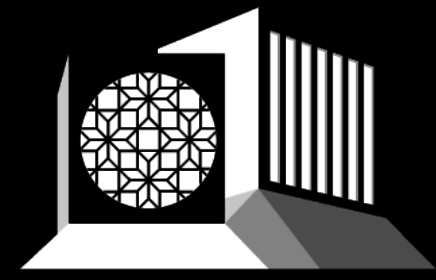
Event/Estimated Cost	Fatalities	Damage ($) (2017, adjusted for inflation)	GDP (%)
11 September 2001 Attacks	2,977	+$13.8 billion	-2.0%
Hurricane Katrina	1,200-1,850	$154 billion	-2.0%
Total	**4,177-4,827**	**+$167.8 billion**	**-4.0%**

(Table: Mark David Major/Sultana Faraj SF Al-Nabet)

جامعة قطر
QATAR UNIVERSITY
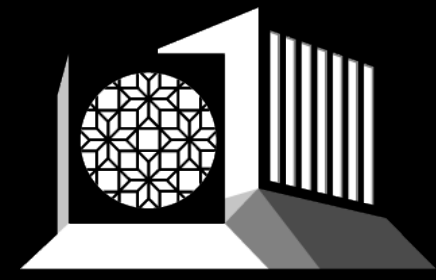
- 9/11 and Hurricane Katrina represent horrific events in terms of lost of life

- But, the collapse of the housing market, 2008 Financial Crisis, and Great Recession (2008-2010) was six times longer and six times more damaging in economic terms

Quarterly Changes in US Gross Domestic Product (GDP), 2000-2010 (Image: US Council for Economic Education)

QATAR UNIVERSITY
جامعة قطر

- Sustainability: maximizing efficiencies while minimizing resources for the greatest number of people

- Resilience: ability of a system to return to a state of equilibrium (or steady-state) after a disturbance, i.e., *engineering resilience* (Holling, 1973, 1986), with an emphasis on 'return time' (Davoudi, 2012)
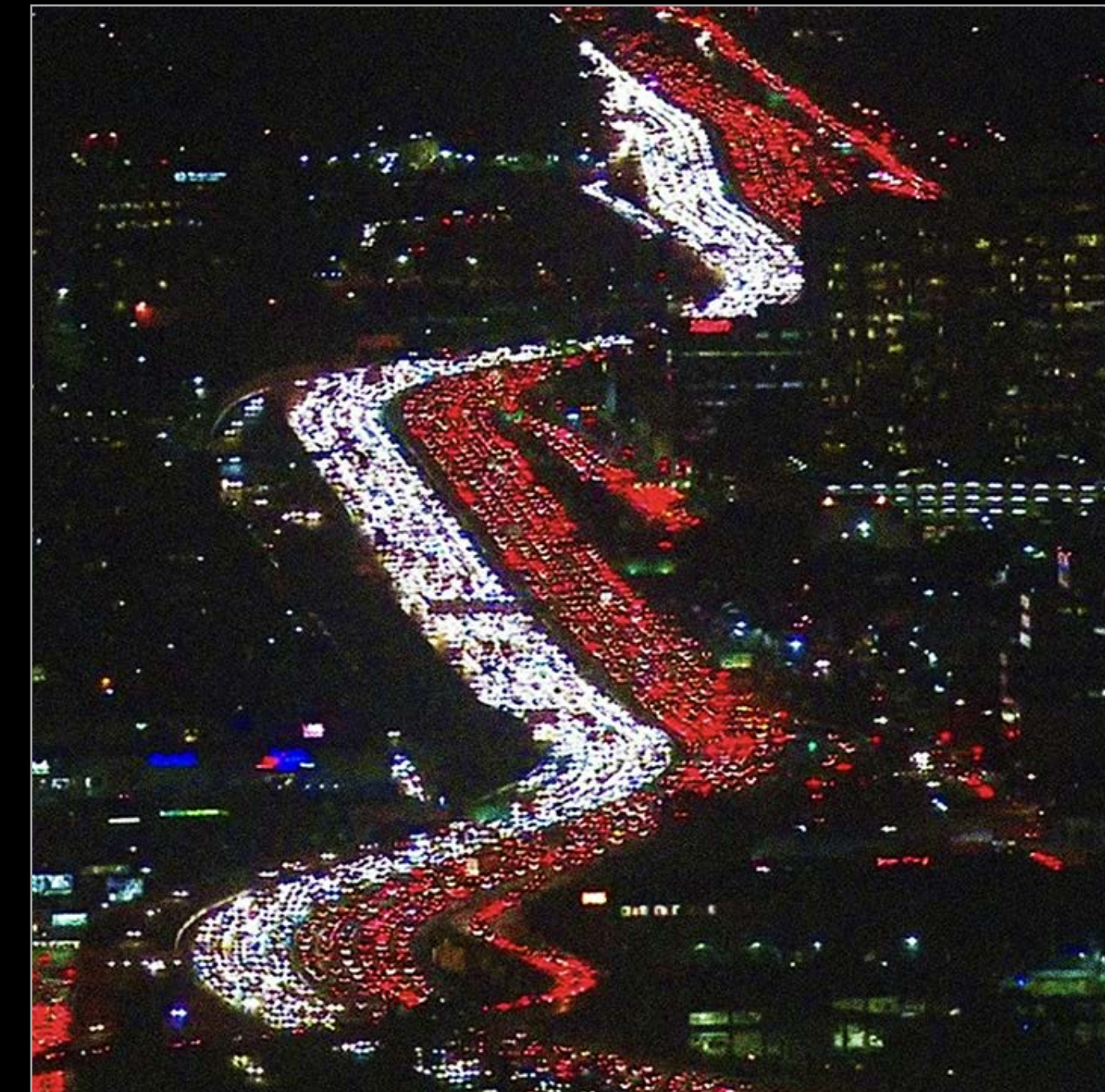
2016 Thanksgiving Weekend Traffic in Los Angeles, California USA (Image: KABC-TV)
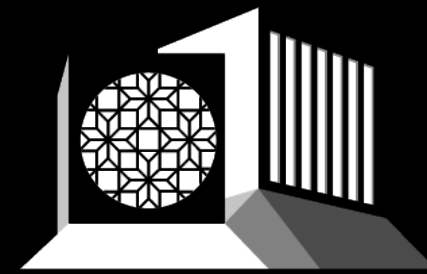
QATAR UNIVERSITY

- Static view of cities as physical and socioeconomic objects reinforces the dominant Modernist planning principles of the 20th century including exclusionary zoning

- Auto-centric, fragmented neighborhoods, subject to instantaneous dysfunction due to the smallest of temporary shocks

- Sprawling, inefficient urban patterns, streets that are 'dead' to most human activities, and a deficiency of 'civil society'

Suburban Sprawl in Phoenix, Arizona USA (Image: Wikipedia)
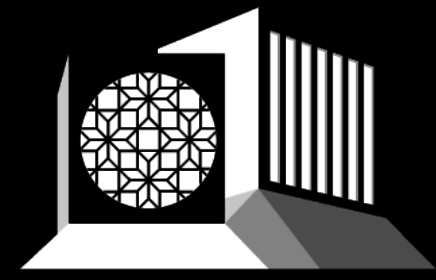
Worldwide Exportation of a Bad Idea

Traffic Jam at a 10-lane Road Intersection in Beijing, China (Image: South China Morning Post)

*April 2011 Traffic Jam on the Al Corniche in Doha, Qatar (Image: Alexey Sergeev/Texas A&M University)*

QATAR UNIVERSITY

- Today, most urban resilience efforts focus on processes and procedures, i.e., institutional, political and social apparatus

- Reactionary approach to the built environment, which inherent in the definition, i.e., ability of the system to bounce back, rebound, or spring back

- Focus on engineering resilience tends to emphasize quantity/speed of economic (mostly governmental) expenditures over design quality

A Simplified Conceptual Schematic of the Urban System (Image: Meerow et al, 2016)
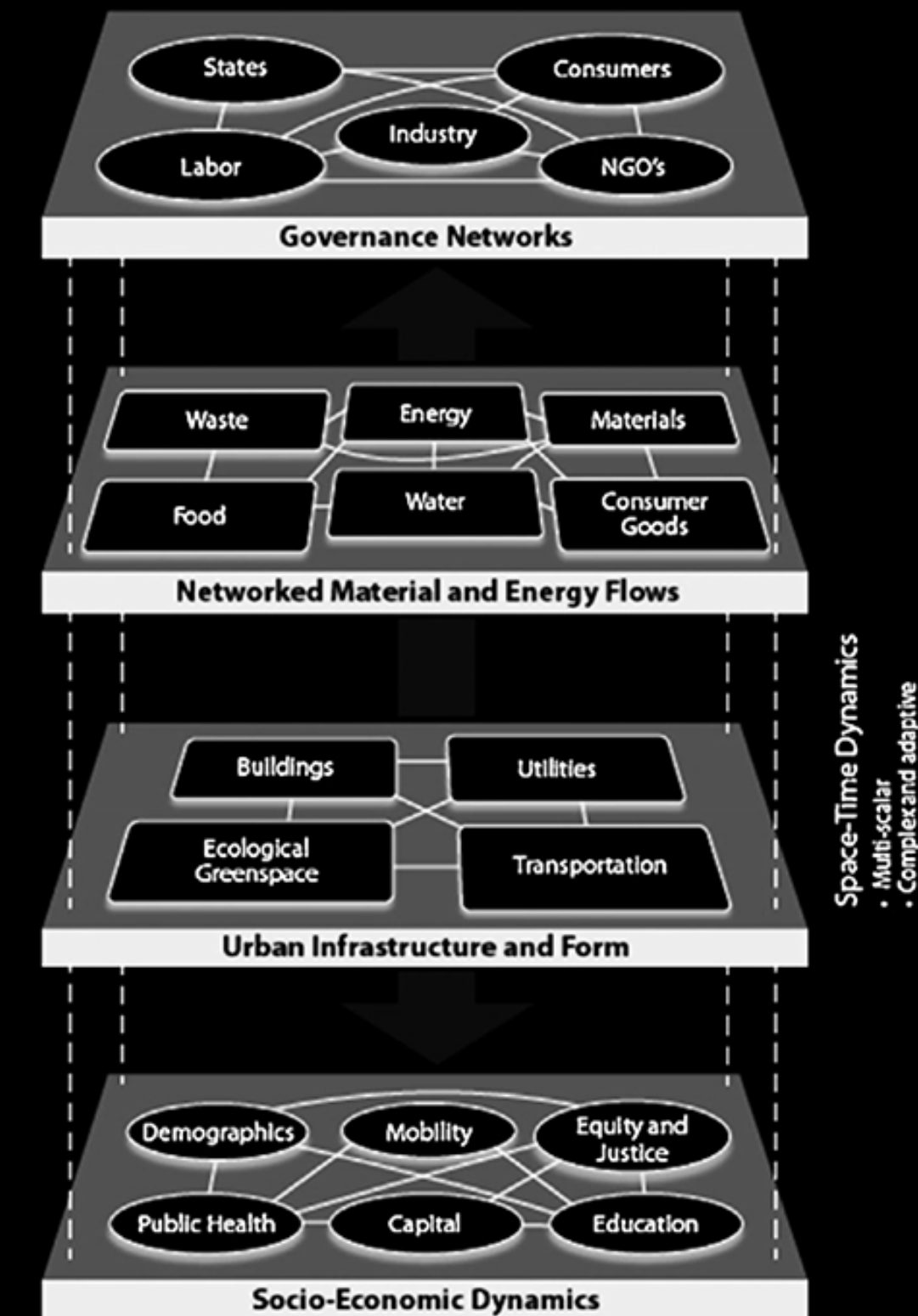
- *Evolutionary resilience*: "ability of complex socio-ecological systems to change, adapt, and, crucially, transform in response to stresses and strains" (Davoudi, 2012)… how cities bounce forward…

- Allows for a more scientific approach to urban resilience (and, by implication, sustainability)

- Enables research that more accurately accounts for the reality of cities as complex, dynamic spatial-formal systems with widespread design implications for functioning as social, economic, and cultural objects
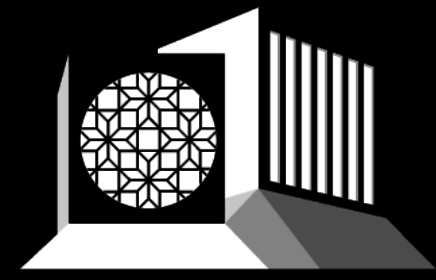
(Image: Mark David Major/Sultana Faraj SF Al-Nabet)
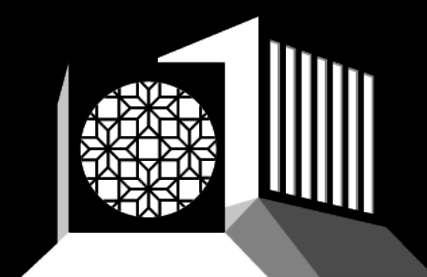
- From fashionable trend to hard science…

- From the present to the past…

- By definition, the oldest, continually inhabited cities in the world (including Athens, Damascus, Jerusalem, Lisbon, Beijing, Rome, Paris, and London) are resilient *and* sustainable urban systems

- What do they have that other cities do not possess?

Table 2: A list of twenty of the oldest, continually-inhabited cities around the world with an estimated 2017 population greater than 1 million people.

Settlement	Location	Occupation Since (approximate)*	Founded (approximate)	Population (estimated 2017)	Age (approximate in years)
Athens	Greece	c. 10-6th Millennium BC	5-4th Millennium BC	+/- 3.7 million	+6000
Gaziantep**	Turkey	c. 3650 BC	c. 3650 BC	+/- 1.5 million	+5600
Aleppo**	Syria	c. 3650 BC	3650 BC	+/- 1.8 million	+5600
Beirut	Lebanon	c. 3000 BC	3000 BC	+/- 2.0 million	+5000
Damascus	Syria	c. 6300 BC	3000 BC	+/- 1.7 million	+5000
Jerusalem	Israel/ Palestine	c. 5000 BC	2800 BC	+/- 1.5 million	+4800
Varanasi	India	1800 BC	1800 BC	+/- 1.2 million	+3,800
Luoyang	China	c. 1600 BC	c. 1600 BC	+/- 1.7 million	+3,600
Lisbon	Portugal	4500-2000 BC	c. 1200 BC	+/- 2.8 million	+3,200
Beijing	China	23rd Millennium BC	1045 BC	+/- 21.5 million	+3,000
Xi'an	China	c. 4700 - 3,600 BC	1100 BC	+/- 12.9 million	+3,000
Tripoli	Libya	c. 700 BC	700 BC	+/- 1.1 million	+2,700
Rome	Italy	c. 12-8th Millennium BC	753 BC	+/- 4.3 million	+2,700
Istanbul	Turkey	c. 6th Millennium BC	685 BC	+/- 14.6 million	+2,700
Benghazi	Libya	c. 525 BC	525 BC	+/- 1.1 million	+2,500
Peshawar	Pakistan	c. 400 BC	c. 400 BC	+/- 4.2 million	+2,400
Alexandria	Egypt	332 BC	332 BC	+/- 4.5 million	+2,300
Seville	Spain	c. 700 BC	c. 700 BC	+/- 1.5 million	+2,200
Paris	France	c. 4200 BC	52 BC	+/- 12.4 million	+2,000
London	UK	c. 4500 BC	43 AD	+/- 14.million	2,000

Not necessarily continuous inhabitation.
*** There is some debate in the literature about the site of the ancient city (Antiochia ad Taurum) associated with these two settlements.*

(Table: Mark David Major/Sultana Faraj SF Al-Nabet)

جامعة قطر
QATAR UNIVERSITY

- What are we doing differently that we were not doing during the previous 8,000-10,000 years?

- Rapid population growth and urbanization, especially in emerging markets

- Designing for things, not people…

- Promising vague technological solutions (Mouzon: "Gizmo Green") in the future while ignoring time-tested solutions that are readily available for design of the built environment today

- Not lapses in human ingenuity but flaws of human nature

World Population and Growth Rate
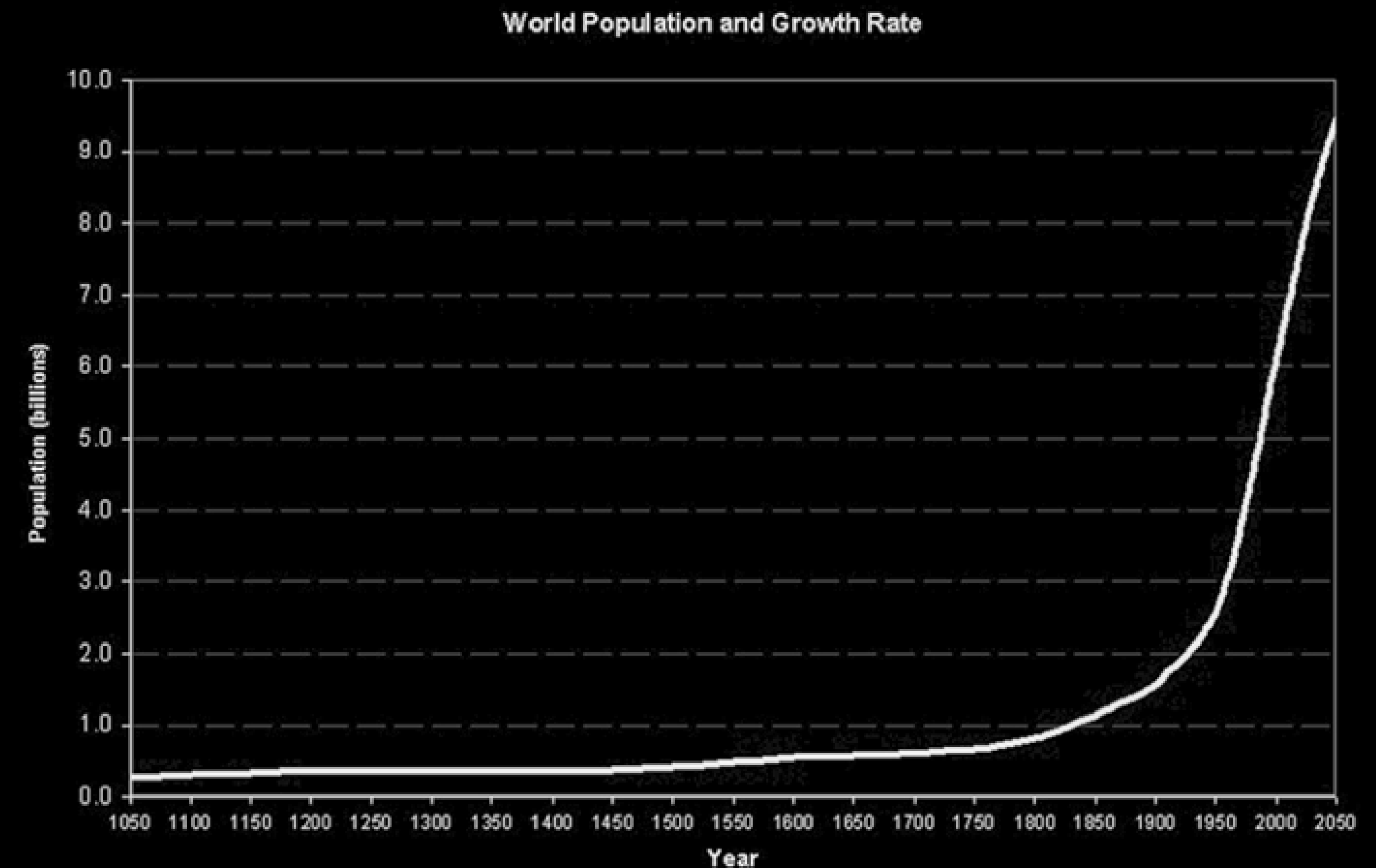
Estimate of World Population Growth Rate from 1050-2050 (Image: United Nations)

Questioning Long-Held Assumptions…

- Amman, Jordan has endured for nearly 9,300 years (except for a nearly half-millennia of abandonment circa 1400-1880) without a public rail system

- Rome, Italy endured for more than 2,700 years without a pubic rail system until 1955

Above The Citadel in Amman, Jordan (Image: University of California, Berkeley)

Questioning Long-Held Assumptions...

- Amman, Jordan has endured for nearly 9,300 years (except for a nearly half-millennia of abandonment circa 1400-1880) without a public rail system

- Rome, Italy endured for more than 2,700 years without a pubic rail system until 1955

- Jerusalem has endured for nearly 5,000 years without a public rail system

- The distinguishing characteristic common to all, besides all being built on seven hills?

- Compact urban blocks and walkability=human scale design

Aerial View of the Temple Mount in Jerusalem (Image: Wikipedia)

Available Now!

THE SYNTAX OF CITY SPACE: AMERICAN URBAN GRIDS

by Mark David Major

with Foreword by Dr. Ruth Conroy Dalton (Head of Architecture, Northumbria University)
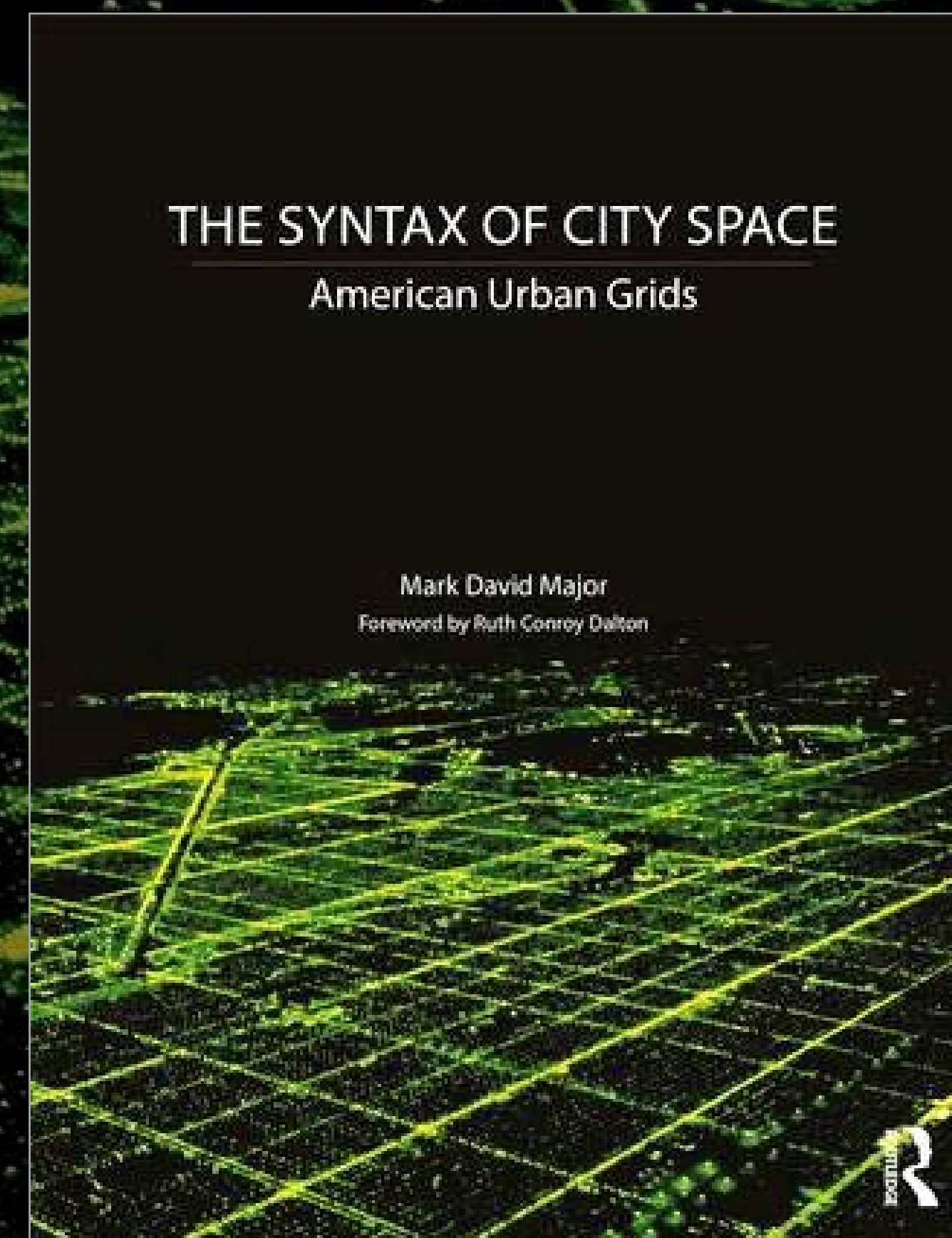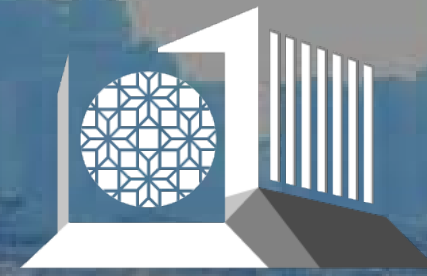
258 pages in full color, New York/London: Routledge

Routledge: £38.39 (PD) | £88.00 (HB) | £43.19 (KB)
https://www.routledge.com/The-Syntax-of-City-Space-American-Urban-Grids/Major/p/book/9781138301573

Amazon: $64.96 (PD) | $142.76 (HB) | $56.99 (KB)
https://www.amazon.com/Syntax-City-Space-American-Urban/dp/1138301574

(Image: Mark David Major/Routledge)

QATAR UNIVERSITY

Buildings Don't Bounce: The Design Paradox of Urban Resilience

Thank you!

Based on the paper accepted for presentation at the New Urban Research Session of the
Congress for New Urbanism 26 (CNU26) Conference, 16-19 May 2018 in Savannah, Georgia USA

Dr. Mark David Major, AICP, CNU-A

Department of Architecture and Urban Planning
College of Engineering, Qatar University
PO Box 2713
Doha, Qatar

Sultana Faraj SF Al-Nabet

Tel   +974 3136 0842 | +974 4403 7392
Fax   + 974 4403 4341
Email   m.major@qu.edu.qa | salnabet@qu.edu.qa
Web   www.qu.edu.qa/engineering/architecture/

Qatar University Campus (foreground) and City Center (background) in Doha, Qatar (Image: Qatar University)