

masters design studio brief

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May 2022

1 Title: Drift / pandemic-proof urban life

Issue:

Evidence suggests that biodiversity loss often increases disease transmission between humans, fauna and flora at microbe levels [1]. In contrast, naturally high biodiverse areas have reduced infectious diseases' frequency. With their intact endemic biodiversity, these ecosystems provide ecological communities with a source pool for new pathogens to emerge [1][2]. As cities recognise the importance of being more biodiverse [4] in UNSDG 11 and 15, the pathway to attaining a high level of biodiversity will not be overnight [3]. Unless new research and technologies can assist in steering the emergence of these new pathogens, unprecedented health crises may still occur.

Studio description:

This design studio reimagines urban life to be future-proof from the pandemic and other threats. Through a system thinking approach, students will critically question the conceptualised urban social-eco-evolutionary dynamics [5] and identify plausible transitional stages of outbreaks. Strategies and ideas to intervene, disrupt or adapt can be explored [14][15][16][17] during these stages to regenerate Melbourne into an area with high biodiversity. The overarching strategy of this studio is to address this issue at the epidemic and physical human-scaled microstructure level. The testing ground will be on a series of Melbourne's public/private spaces linking architecture and the urban environment.

Studio outcomes:

Students can draw on their own experience living through a pandemic and work in pairs to systematically analyse previous epidemics/ pandemics to understand transmission modes from social and biological information [12][13]. To formulate a project brief, students will learn to define research frameworks and programs. The design process is a dynamic cycle of improvements in the research framework with rigorous testing of generated alternatives before concluding as a representation with outlined future improvements [9]. Evaluation of the explored options using micro simulation and epidemiological modelling translates qualitative rules and behaviour into the quantitative analysis as evidence to support decision making. The result may offer insights for assumptions about

the nature of infectious [10]. The final reflection of this design studio stands to discuss the feasibility of urban social-eco-evolutionary framework [5][6][7][8] for rewilding Melbourne.

The studio will go through four stages:

- 1 Intention: Define strategies and ideas to draft an initial design project brief.
- 2 Realisation : Develop ideas and computation methods to explore and generate exhaustive inventory of alternatives.
- 3 Evaluation : Develop evaluation methods and criteria for explored design alternatives. The result can support decision making.
- 4 Representation + future improvements : Represent the future-proof urban life proposals, reflect and present improved design project brief for the next cycle of improvement.

References

- 1 Keesing, F., Belden, L., Daszak, P. et al. Impacts of biodiversity on the emergence and transmission of infectious diseases. *Nature* 468, 647–652 (2010).
<https://doi.org/10.1038/nature09575>
- 2 Keesing, F., Ostfeld, R. S. (2021). Impacts of biodiversity and biodiversity loss on zoonotic diseases. *Proceedings of the National Academy of Sciences of the United States of America*, 118(17), 1–4.
<https://doi.org/10.1073/pnas.2023540118>
- 3 Pierce, J. R., Barton, M. A., Brown, I. T., Johnson, B. R., Mooney, P. F., Tan, P. Y., ... Yun, M. (2022). Operationalizing Urban Biodiversity. *The Routledge Handbook of Sustainable Cities and Landscapes in the Pacific Rim*.
- 4 Pierce, J. R. (2022). Cities and biodiversity. *The Routledge Handbook of Sustainable Cities and Landscapes in the Pacific Rim*, 211.
- 5 Alberti, Marina Palkovacs, ErDes Roches, Simone Brans, Kristien Lambert, Max Rivkin, Ruth Savage, Amy Schell, Christopher Correa, Cristian De Meester, Luc Diamond, Sarah Grimm, Nancy Harris, Nyeema Govaert, Lynn Hendry, Andrew Johnson, Marc Munshi-South, Jason Palkovacs, Eric Szulkin, Marta Urban, Mark Verrelli, Brian Alberti, Marina. (2021). Socio-Eco-Evolutionary Dynamics in Cities. *Evolutionary Applications*. 14. DOI:10.1111/eva.13065.
- 6 Alberti, M., Marzluff, J. M., Shulenberger, E., Bradley, G., Ryan, C., Zumbrunnen, C. (2003). Integrating humans into ecology: opportunities and challenges for studying urban ecosystems. *BioScience*, 53(12), 1169–1179.

- 7 Alberti, M. (2008). *Advances in urban ecology: integrating humans and ecological processes in urban ecosystems* (No. 574.5268 A4). New York: Springer.
- 8 McPhearson, T., Pickett, S. T., Grimm, N. B., Niemelä, J., Alberti, M., Elmqvist, T., ... Qureshi, S. (2016). Advancing urban ecology toward a science of cities. *BioScience*, 66(3), 198-212.
- 9 Taylor, P. (2022). *Metadesign and Design Science: Buckminster Fuller's Contribution*. In *Metadesigning Designing in the Anthropocene* (pp. 57-73). Routledge.
- 10 Nikolaou, M. (2022). Revisiting the standard for modeling the spread of infectious diseases. *Scientific reports*, 12(1), 1-16.
- 11 Lobo, José Alberti, Marina Allen, Melissa Arcaute, Elsa Barthelemy, Marc Tapia, Luis Brail, Shauna Bettencourt, Luís Beukes, Anni Chen, Weiqiang Florida, Richard Gonzalez, Marta Grimm, Nancy Hamilton, Marcus Kempes, Chris Kontokosta, Constantine Mellander, Charlotta Neal, Zachary Ortman, Scott Youn, Hyejin. (2020). *Urban Science: Integrated Theory from the First Cities to Sustainable Metropolises*. SSRN Electronic Journal. 10.2139/ssrn.3526940.
- 12 Kuitert (2013). "The Nature of Urban Seoul: Potential Vegetation Derived from the Soil Map". *International Journal of Urban Sciences*. 17 (1): 95–108. doi:10.1080/12265934.2013.766505. S2CID 129785752.
- 13 Steiner, F. R. (2011). "Landscape Ecological Urbanism: Origins and Trajectories". *Landscape and Urban Planning*. 100 (4): 333–337. doi:10.1016/j.landurbplan.2011.01.020.
- 14 Batty, M. (2018). *Inventing future cities*. MIT press.
- 15 Yeang, K. (2019). *Saving the Planet by Design: Reinventing Our World Through Ecomimesis*. Routledge.
- 16 McDonough, W., Braungart, M. (2005). *Cradle to cradle*. McGraw-Hill Education.
- 17 Other references
 - Ecological architecture and urbanism, Prof. Ken Yeang
 - Cradle to cradle theory, William McDonough
 - <https://youtu.be/IoRjz8iTVoo>
 - Renzo Piano
 - Norman Foster
 - Ecological Urbanism
 - <http://ecologicalurbanism.gsd.harvard.edu/>

Biodiversity in Urban Environments

<https://www.archdaily.com/974707/biodiversity-in-urban-environments>

Australian Architects declare climate & Biodiversity Emergency

<https://au.architectsdeclare.com/>