



Making Cities Safer for Girls and Women

THE CHALLENGE

Melbourne and Sydney—two of the world's most liveable cities—aren't equally liveable for everyone. Crowded spaces, unpredictable people, and the risk of assault or harassment can make the urban environment an intimidating—and dangerous—place for some, especially after dark. Because experiences of feeling unsafe or unwelcome often go unreported, they aren't captured in the data sets city designers and policymakers use when shaping urban environments. How should we incorporate these important but often under-represented voices into our design and decision-making processes? How do we ensure that everyone feels safe and encouraged to participate in the city

SCROLL ↓

IN THIS ARTICLE

- How Arup is collaborating with YXX Labs at Monash University to analyse data from *Free to Be*, a digital mapping platform design by *PlanInternational* and *Crowdspot* which empowers young women to speak up about how and why their cities don't feel safe.
- Why brighter lighting doesn't always equal safer.
- How bringing night time designers together with diverse user groups is helping to shape new opportunities for safe, more inclusive and prosperous cities.

We need to understand the patterns that exclude women from areas of cities and not defer to the usual responses – brighter lighting, more CCTV cameras and more authority figures. In fact, our research into unsafe "hotspots" has found young women's perceptions of urban safety do not correlate with the most brightly lit spaces. - Dr Nicole Kalms, YXX Lab (via The Conversation)

A recent study, conducted by not-for-profit *Plan International* in conjunction with Monash University YXX Lab, asked young women and girls in Melbourne to share their experience of the city. Six hundred young women responded with how they perceive their safety in public places. The findings from the study were sobering for a city considered to be one of the safest in the world. 30% of respondents said they did not feel safe in public places after dark, due to experiences from unwanted attention—cat-calling and being followed—to incidents of physical and sexual assault.



The goal of Free to Be is to create a forum where young female residents can let policymakers and city shapers know where things aren't working and how they can be improved. How people perceived a space was anchored in their experiences—particularly experiences of harassment and abuse, which often go unreported and thus do not show up in the crime statistics city shapers and policy makers use when designing urban environments. So far, Free to Be has created maps for Melbourne, Sydney, Delhi, Kampala, Lima and Madrid.

When findings from the Sydney and Melbourne maps were released, it revealed just how differently segments of our populations experience their city. For example, in Sydney over 2,700 pins were dropped. Of these, nearly 75% of pins denoted bad experiences, with over two-thirds reporting sexual harassment of some kind. Negative experiences often occurred in daylight hours, often in crowded areas. However, night time saw the most negative pins dropped.

Read the ABC news take on the research [here](#).

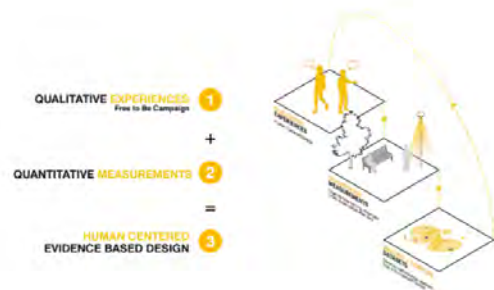
One piece of data caught the eye of Hoa Yang, a lighting designer in our Melbourne office. Over a third of young women and girls in both Sydney and Melbourne mentioned lighting as a contributing factor to their experiences, good or bad. This type of empirical data around how lighting makes people feel at such a large scale has never been collected in the past.

As a lighting designer, Hoa was blown away by the number of people who even mentioned lighting in their urban experiences. So Hoa and fellow lighting designer Tim Hunt reached out to XYX Lab see if they could help the team to determine exactly what it is about lighting that affects the perception of safety—delving beyond 'too bright' or 'too dark'.

"These lived experiences are real and systemic in many parts of our daily lives. As built environment practitioners, we play a crucial role in challenging the way we currently design our cities to come up with practical ways that listen to and address the issues that such a large proportion of our society face everyday" - Hoa Yang

In a true human-centred approach, the team began digging through the Free to Be data set to unpack what participants said about their experience around lighting. By analysing Free to Be's crowd sourced experiences, they were able to determine key sites to start analysing qualitative measurements to understand these urban experiences holistically from a social and hard science lense. Hoa and team member Chris Alexander then visited 86 Melbourne locations where people had dropped pins – positive and negative.

They recorded technical characteristics of the lighting in the areas like colour temperature, vertical and horizontal illuminance—how much light emits from a source—and luminance, which is how the eye perceives light. The team also examined the physical qualities and context of the locations themselves. How wide was the footpath being lit up? Where there any trees in the surrounding area that might break up a pedestrian's line of sight?



The main finding? The design standards used for lighting compliance in most countries don't take the multitude of the way humans experience light into account. In fact, the findings show that we tend to light for cars rather than for the people on the streets. The team also found that the quality of the light, not the level or quantity, is the most important factor in how people perceive an environment. Light rendering – how similar the colours in an artificially lit environment resembles the way it would in daylight – is particularly important.

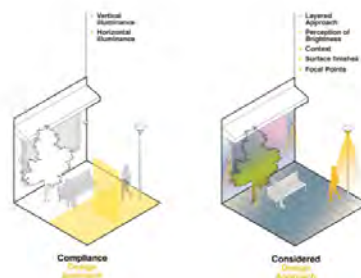
This creates a higher degree of familiarity with the space, allowing people to be able to make out their surroundings and be able to distinguish the difference between a bush and a person. "Our current standards prioritise lux levels— which

are easy to measure. Yet we don't see the amount of light coming out of a street light. We see what bounces off the surfaces around us," says Hoa Yang

To consider the implications of this, it's important to understand how spaces are currently lit. Generally, when we design for safety, we rely on crime statistics to tell us how dangerous a place is, which informs the amount of lighting to install. But since harassment and assault so often go unreported, traditional crime statistics aren't a great proxy for whether a space is truly safe or not—let alone how safe it feels.

The current designs in Australia focus heavily on the evenness and intensity landing on the floor surface. Illuminance and uniformity are the values that appear in engineering and design standards and policies. We see single poles with a down light throughout our cities because they are the most cost effective way to meet these requirements. What the standards don't take into account is how people's eyes see light, or our perception of brightness.

The way light bounces off different road colours, surface finishes or the brightness of the area outside of the concentrated beam of light are all things that can affect our perceptions of brightness and safety in a space. If a space is only designed to consider the amount of light being emitted by the light source and not the contextual makeup of the space, even though it meets the guidelines, it doesn't take the human experience of seeing and feeling light into account.



And that perception of safety makes a huge difference. It influences whether people avoid a certain part of the city, feel comfortable using social amenities like public transit, or even leave their house after dark at all. While this study focuses mainly on young women and girls, the findings may have a similar effect on other vulnerable populations, including older people, children and many groups currently underrepresented in professions who design and shape cities.



While visually collating their findings into a GIS database, the team quickly realised what they were building was an experience map of the city. This could easily be overlaid with other complimentary data, like the way a city smells or the way it sounds.

This research project has developed a methodology that takes an evidence based, bottom up approach to design lighting for public spaces for a more inclusive outcome. The team is now trialling this approach in case studies, co-design workshop alongside collaborators XYX Lab as the first step to inform more holistic decision making.

"The outcomes from this research will revolutionise the way we design public space at night" - Tim Van

As city shapers, we need to get better at designing with inclusivity of experience at front of mind. We need to learn to question the appropriate of standards rather than simply aim for compliance. By combining holistic evidence-based experience design, cutting edge research techniques, and cross-disciplinary collaboration we can work toward including more voices that were previously ignored in city shaping conversations.



By designing for the challenges faced by the most marginalised members of our communities, quite often we end up creating solutions that positively impacts us all. In creating safer, more inclusive and more equitable cities we are creating vibrant communities that can be enjoyed by all of us, no matter what time of day.

We hope this project will trigger conversations about how different people perceive their environment, and how we bake these differences into more inclusive city design. Our cities are becoming increasingly diverse. The decision makes who shape and build cities need to reflect this in our design methods.

We are grateful to XYX Labs at Monash University, and Plan International, for allowing us to contribute in a small way to their study. Download their findings by country [here](#). Their recent report, *Unsafe in the city*, presents their findings, and recommends



FINDINGS

- It's time to start proactively designing holistically for all 24 hours of the day, starting with considering night time experiences and movement as crucially different from daytime.
- Integrating lived experience at the earliest stages of urban design conversations boosts positive experiences of the city for more people, with roll on impact to social and economic outcomes.
- By welcoming participants from different sectors of the community -- and of different ages, backgrounds and experience levels -- we can create more inclusive cities for all.

This story was written by Jeff McAllister as part of the *Research Review series*. The series is produced by the *Arup Australasia Research team*; Alex Sinickas, Bree Trevena and Jeff McAllister with contributions from *Sheda and Noel Smyth*.

LEAD ARUP RESEARCHER



Hoa Yang  



Hoa is a lighting designer in our Melbourne team. That's her on the front cover of this issue.

Ask Hoa about:

- Best and new practice for lighting design.
- Qualitative and quantitative approaches to evaluating lighting design.
- The contribution lighting can make to night time spaces.

LEAD PARTNER RESEARCHER



Dr Nicole Kalms and XYX Labs  

Dr Nicole Kalms is a Senior Lecturer at Monash University and founding director of the XYX Lab which leads national research in space, gender and communication.

RESEARCH TEAM



TIM HUNT

Tim is a lighting designer in our Melbourne office.



BREE TREVENA

Bree manages our Australasian Research program.



ANTHONY AISENBERG

This research builds upon work by Anthony, Founder and Director of Crowdsport



SOPHIE
TANNER

This research builds
upon work by Sophie,
Research Manager at
Plan International

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A NOT SO SILENT NIGHT

Understanding what happens in cities after dark is crucial to global sustainable development, but will also help create a fairer society that values the night-time economy

By Professor Michele Acuto, University of Melbourne

DESIGN

Featured



Professor Michele Acuto
Professor of Global Urban Politics and Director of the Connected Cities Lab, Melbourne School of Design, Faculty of Architecture, Building and Planning, University of Melbourne

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The world of waste collectors, night shift nurses, office cleaners, rough sleepers and security guards rarely makes international headlines.

Yet the night-time is critical to building a fairer and more sustainable future for our cities. To do so, we urgently need to think more strategically about what happens after hours in Australian cities.



Around nine percent of Australian employees work in the night-time economy. Picture: Getty Images

In a [recent Nature 'worldview'](#), I argued that understanding what happens in cities after sunset is crucial to global sustainable development.

The night-time is a critical space for addressing some of today's most pressing sustainability challenges. For example, internationally, energy use peaks during evening hours.

Then there is the an estimated 154 million people – about [two per cent of the world's population](#) – who are homeless and face precarious situations at night when seeking food, shelter and transport in socially and environmentally hostile climates.

In Australia it is has been [estimated that around nine per cent](#) of employees works in the night-time economy. Many are on low pay and work in

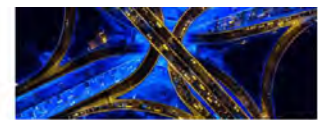


unhealthy conditions, juggling multiple jobs. They also face longer and more difficult journeys to work, or to access services, [than their daytime colleagues](#).

More than two per cent of Australian households live in 'food deserts' concentrated in low-income and outer suburbs, like Western Sydney and Wyndham in Greater Melbourne, where access to affordable, healthy food options is limited or non-existent.

At night, these conditions worsen as basic services like transport, retail and healthcare stop or shut and affordability plummets.

Some cities are already waking up to the issue of what happens in cities at night. In 2018, New York, the 'city that never sleeps', set up an [Office of Nightlife](#).



What is the best urban design to reduce road injuries?

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Cities differ greatly in their approach towards night-time infrastructure and regulation. Picture: Getty Images

In 2012, Amsterdam appointed its Night Mayor. London has had a Night Czar since 2016.

As [research from Harvard's Graduate School of Design](#) flags, though cities differ greatly in their approach towards night-time infrastructure and regulation, there seems to be a "growing consensus on the need for permanent nocturnal governance structures".

Over 40 international cities have already done so, with at least 10 more just about to join the ranks. It might be time for Melbourne to follow suit.

A recent Council of Capital City Lord Mayors' report, [Measuring the Night Time Economy 2016-17](#), highlighted that Victoria accounts for 28 per cent of national NTE (Night Time Economy) establishments, 25 per cent of its employment and 26 per cent of total NTE turnover.

Yet Plan International's [Free to Be](#) program provided an online mapping tool for women to identify and share the location of public spaces that make them feel uneasy and scared. It highlighted how 90 per cent of women don't feel safe in a city like Sydney after dark.

Likewise, [colleagues in Sydney and Perth noted](#) that night-time council policies have been "gentrifying the night", and pricing out communities from nightlife precincts across metropolitan Australia, rather than promoting economic vitality.

To drive a more effective and socially just 'after hours' perspective into the heart of planning and urban policy, we need a step change in university education for the built environment.



Keeping our cities working

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At night, the conditions worsen as basic services like transport. Picture: Getty Images

For example, the [Connected Cities Lab](#) is working at the Melbourne School of Design and with engineering and design company [Arup](#) on a [‘night time studio’ program](#) designed to build greater ‘night-time literacy’ for a new generation of urban practitioners.

The aim is to increase an appreciation among practitioners that what happens after hours fundamentally shapes the future of cities.

Among [our projects](#), we have been working with [Melbourne School of Design](#) students on a studio to map governance of the night-time internationally and evaluate how Melbourne is performing vis-à-vis the [United Nations Sustainable Development Goals](#) (SDGs).

Research in this area is coming up with evidence-based solutions and along the way busting a few myths. For example, [as Arup and Monash University researchers have noted](#), more lighting alone doesn’t increase safety.

After London appointed its Night Czar, I [argued](#) that simply appointing such ‘mayors’ for the night time, while a positive step, wasn’t [a panacea](#). Better supporting the night-time requires sustained hard work to build bridges across jurisdictions and stake holders.

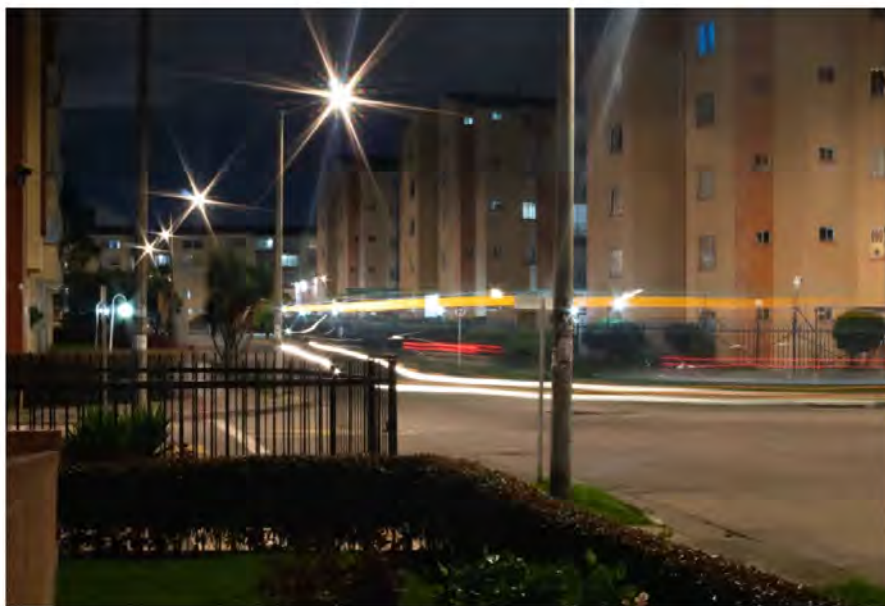
University of Melbourne Associate Professor Tim Edensor has been advocating for a better appreciation of [shade and shadows](#), while I have been highlighting the importance of [citizen engagement](#) and [learning from experiments](#).

Overall, researchers are arguing that the most effective solutions are grounded in holistic urban design that goes deeper than quick-fix interventions like, for example, Sydney’s [lockout laws](#).



Engineering a smart city

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Better planning could mean adopting better night-time strategies like adjusting street lighting. Picture: Shutterstock

Research on night-time trends could eventually lead to more nuanced approaches to planning by promoting [‘temporal zoning’](#) analogous to spatial zoning.

This can range, for example, from timing lighting in streets and parks to limit the impact on animal behaviour, to adopting night-time strategies that time the availability of [transport infrastructure](#) to ensure equitable access.

Night-time research can enable us, as work by Ben Campkin and colleagues at

[University College London's Urban Lab proved](#), to move from regulatory or responsive night management to more proactive nocturnal place-making.

It can also amplify a variety of voices in decision-making, like maintenance or leisure sector workers who are often from migrant communities, as well as elderly people and families who are often left out in youth-centric discussions about night-time leisure activities.

In London, the Mayor's Night Czar, Amy Lame, holds regular 'Night Surgeries' to consult with communities across the British capital.

However, in Melbourne, the night was afforded only one mention in the Council's 2017-2021 plan – in the context of safety.

This was the same as in the Council's previous 2013-17 plan. Night management, couched as 'night time economy', currently sits in the Council's 'Prosperous City' portfolio under 'economic activation'.



[Making Australia's most liveable city more inclusive](#)

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Internationally, energy use peaks during evening hours. Picture: Getty Images

At a minimum we need a new night-time strategy, but the development of that strategy may need institutional or governance changes to drive it. For example, Melbourne could benefit from a democratic, visible, accessible and strategic 'voice' for Melbourne's nights.

Perhaps a night mayor for the city or even for Greater Melbourne?

Honorary or partial mayoral positions run the risk of being a token appointment if they are not backed by a solid capacity to implement strategic policy.

A night-time manager needs a dedicated night-time urban design team, possibly in joint collaborations with university research teams that are already building greater knowledge about the night time.

An 'office of the nightlife' with a solid grounding in planning and environment, links to knowledge institutions, and a remit across all council portfolios might be just what the city needs.

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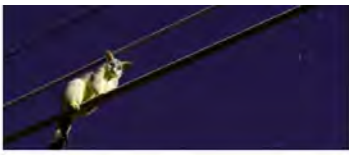
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More lighting alone does not create safer cities. Look at what research with young women tells us

May 28, 2019 3:54pm AEST

Bright light does not necessarily make a space feel safer, as seen here where there's a sharp drop-off into dark shadows at the edge of the path. [giphy.com/551k0t0m0302](#)

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[I] walk this route to the train station. I often get cat-called whilst walking to the train. It's also very poorly lit at night. (Female, age 27)

In 2019, [The Australia We Want](#) report noted that at least half of Australian women do not feel safe walking alone at night. This is unsurprising given the [prevalence of sexual harassment](#) and gender violence women manage when moving through cities every day. Women's avoidance of areas of the city creates a [complex internal geography of exclusion zones](#) and "take extreme care" zones – all in the hope that this vigilance will keep them out of harm's way.

Protecting women from the violence committed by some men is a priority. So too is recognising that most [cities are gender-blind and disregard women's needs and experiences](#).

[Read more: Crowd-mapping gender equality – a powerful tool for shaping a better city launches in Melbourne](#)

We need to understand the patterns that exclude women from areas of cities and not defer to the usual responses – brighter lighting, more CCTV cameras and more authority figures. In fact, [our research](#) into unsafe "hotspots" has found young women's perceptions of urban safety do not correlate with the most brightly lit spaces.

We know that creating safer cities for women requires one fundamental shift: that we [listen to women's voices](#). We need to develop urban strategies and planning policies that draw on women's experience and expertise as users of city spaces.

I pass through here twice a day to get to work and am routinely verbally abused by men. I feel unsafe and would never go through here at night. I wish the police or government would listen to women's stories and do something about this place. (Female, age 25)

[Read more: To design safer parks for women, city planners must listen to their stories](#)

What does the research tell us?

Author



Nicole Kalms
Director, YX Lab, and Associate Professor, Faculty of Art, Design and Architecture, Monash University

Disclosure statement

Nicole Kalms is the Director of the Monash University YX Lab. This research is a collaboration between Plan International, Monash University YX Lab and ARUP.

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[Plan International](#), the [Monash University YXX Lab](#) and [ARUP](#) lighting researchers have pooled their expertise to drill down into the stories of young women and analyse the relationship between urban lighting and women's perceptions of safety.

The research struck on some compelling correlations between light levels and unsafe places. Analysing over 80 of the most unsafe "hotspots" identified by women in Melbourne, the research found that high illuminance – or very bright and overlit spaces – does not correlate with young women's perceptions of urban safety.

This is important information as planners often light spaces to a high "P" [Category](#) (a measure used in urban place-making guidelines) of lighting. It's assumed this will reduce the risk of crime and increase the feeling of safety.

But our research shows that designing lighting that is positive for women's urban experience requires more nuance. The findings show that sites with higher light levels are more likely to be perceived as unsafe sites – the average light level across these sites was twice what was measured across safe sites. This is a finding with the potential to radically change a city's approach to lighting for safety.

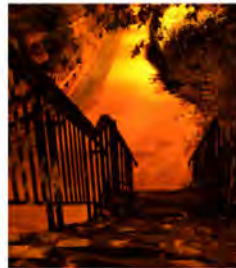
Never felt safe walking in this area, even if I am not alone. The lighting is terrible and the design of the walkways leaves a lot of spots hidden from view. (Female, age 19)

This area feels so dodgy. The light level means you can't see who is approaching you. (Female, age 39)

The analysis showed that consistent and layered lighting – where there are multiple light sources and where surfaces with different reflective values are taken into consideration – makes women feel most safe. This kind of lighting reduces the "floodlit effect", the sharp drop-off of light beyond the path, and the potential for glare and contrast to blind and disorientate.

The emphasis on LED lights for their energy efficiency is unquestioned. But in urban lighting they are mostly a higher colour temperature such as 4000K "cool white" and above. This new research challenges the effects of this approach.

ARUP's research shows the human visual spectrum reacts better to warm light, and the data from young women showed how sensitive they are to cool white light with regard to feeling safe in cities. Spaces with warmer colour temperatures are perceived as safer places.



Instead of yellowish sodium lighting, women prefer a high-quality LED light that enables them to distinguish shapes and colours. [flickr.com/Southside00](#)

Looking deeper into the quality of light in our cities, the majority of bad areas had a very large range of colour rendering. The lowest colour rendering came from sodium luminaires that make everything look overly yellow. Women preferred a high-quality LED light that enabled them to distinguish shapes and colour, helping to create a sense of safety.

Read more: [Safe in the City? Girls tell it like it is](#)

What does this mean for urban design?

More broadly, the research challenged the assumptions that urban lighting design relies on in general, and the effect it has on the character of our cities at night.

At present, illuminance (the measure of light falling on a surface, or Lux) is the only unit of measurement required to comply with the P Categories of the Australian Standards. Based on the results, it appears other metrics such as luminance (light bouncing off a surface and hitting the observer's eye) should be considered too. This will ensure the context of material finishes and surface intensity is taken into account for how the eye perceives space.

Through research such as this, we have the knowledge, data and technology to engage women in trialling new ways of co-designing better outcomes for cities after dark. We can use considered urban design as a tool for positive change.

This article was co-authored by ARUP VIC/SA lighting leader Tim Hunt. The site analysis was led by ARUP lighting designer Hoa Yang.