Hong Kong’s political economic system, mountainous topography and population make it one of the densest urban environments in the world. The population density and resultant extremely high land values have triggered vertical development and a tendency for compact dwelling units. The combination of high land values and one of the world’s most restrictive building codes tends to incentivize standardization and repetition in building organization, form and production, especially for residential development.

This design project seeks to address typical modes of standardized design and production by investigating the use of parametric design and modelling technologies for precast building facades. The project also addresses issues of density and urban compaction, specific to cities like Hong Kong, by proposing a new, ultra-thin residential building type.
The design team analyzed the floor plans and building façade components of typical residential towers in Hong Kong. Due to planning strategies and building code requirements, many housing estates in Hong Kong are composed of repetitive towers with eight units per floor, arranged in a symmetrical fashion around a service core. The use of standardized building façade components is also widespread in Hong Kong and closely linked to building codes. Financial and Gross Floor Area (GFA) incentives for pre-fabricated components in recent decades also encouraged developers to make use of factory cast façade elements such as projecting bay windows (Figure 2).

With an understanding of layout planning and financial incentives for precast façade elements, the design team literally unfolded the floor plan of a typical high-rise, Hong Kong apartment building into a linear array of rooms along the façade of the building. The result is a thickened strip of exterior and interior space that the project uses as a conceptual platform for design. The model revealed a thickened façade system where window projections, balconies, plumbing and mechanical systems on the exterior were intimately related to furnishings, rooms and programs on the interior (Figure 3).

From the conceptual drawings and models, the design research explored the challenges and limitations of living in Hong Kong’s compact spaces by producing an extremely narrow linear apartment for a single individual. By rearranging a series of residential programs into a thin strip, the project pushes the design of a domestic environment to a spatial extreme (Figure 4).
Exploded Axonometric Drawing Analysis of the South Horizon Estate in Hong Kong Showing Dense Master Planning of Repetitive Towers Arrayed in a Field with Typical Floor Plan and Unit Layouts
The project utilized the Rhinoceros modeling software with the parametric modeling plug-in Grasshopper to develop a new catalogue of projecting bay windows that offers subtle variation in window height, width, depth and orientation (Figure 5). In the prototype, spaces for living, dining, cooking, bathing and sleeping are arranged in a linear array of miniature rooms. Window units are angled and inflected inwards and outwards to adjust for privacy or views. Room types can be sequenced differently on each floor according to the desires of the occupants. Units are stacked on top of each other to create a building that may be attached to the blank party walls of industrial or commercial buildings to take advantage of highly valuable, under-utilized space in the city (Figure 6).