

# Visualization of Urban Futures: A GeoDesign Approach to the Greater Toronto Area

John Danahy of the University of Toronto discusses a project about using urban design models for better decision making in urban sustainability.

<http://video.esri.com/watch/976/visualization-of-urban-futures-a-geodesign-approach-to-the-greater-toronto-area>

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## Video Transcription

**00:01** I'm a teacher of landscape architecture at the University of Toronto with the Center for Landscape Research...

**00:06** ...and I thought I'd lead with a project that I've been spending the last five or six years working on...

**00:12** ...using the geodesign tools we've built over the years.

**00:16** In this case, it comes from the premise that I was always finding in first professional MLA program...

**00:21** ...that we were teaching philosophers how to be landscape architects in a year.

**00:26** So I was interested in and being effective coming up with design.

**00:30** So the last few years I've been experimenting with the community I live in, because they approached me and asked me...

**00:35** ...what could we do with the community?

**00:37** This plan you're seeing right here is result of using those tools to create a new community plan...

**00:44** ...that's six or seven times denser than anything the planners were saying they should do.

**00:50** And I think it's a really interesting aspect when people can negotiate this for themselves with their own language...

**00:56** ...so I'm really interested in all of these tools as a form of spatial literacy that people can engage...

**01:02** ...not in one-way communication but in dialog.

**01:06** So this came about through a two-year conversation, taking what used to be a half-million dollar computer system...

**01:12** ...and doing it on a netbook at a kitchen table.

**01:15** So I think there's room for optimism.

**01:18** The project I'll try to focus on here is one that began by bringing together people in engineering...

**01:26** ...and in our field around the greater Toronto area.

**01:30** And what it's facing, a whole series of demands, a hundred thousand people a year immigrate to the city.

**01:36** On top of that, Canada's moved from a country of 20 percent urban to 80 and about to be 90 percent urban.

**01:44** But we weren't used to living in cities in that way.

**01:48** Most of our cities, 80 to 90 percent of them are post-World War II.

**01:52** So the places, the province tried to step in. It's been saying densify.

**01:57** But it's whole thing is hinging on urban design and the quality of the microscale.

**02:02** So for Carl's scales, I have to operate at 1 to 50 and up, and it's going to be a bottom-up meeting top-down strategy.

**02:11** So I've been experimenting from the bottom up.

**02:14** The complete streets ideas, my colleagues, but we have to operate from the complete street to this scale to solve this problem.

**02:21** And one of...another vexing component is that Toronto is a nineteenth-century city, is the part that everyone loves.

**02:28** And cities are now places for the Jan Gehl showing, not places of work but places of recreation.

**02:34** So the middle class and all of us have moved into the nineteenth-century city and have started to gentrify it and displace the populations.

**02:43** So the traditional immigrant staging neighborhoods have shifted from these areas into these areas.

**02:50** And, they now have to find...we have to find ways of retrofitting the post-World War II landscape at the detailed scale...

**02:58** ...and employment patterns, so on.

**03:00** So this...this is the challenge we've been working at, but I'll focus now on a case study we were working...

**03:06** ...which is focusing on urban design towards the others.

**03:09** How do we retrofit these environments, looking at spatial patterns?

**03:13** The key is the tool that I've had the privilege of having people...in my lab build for me over

the last 25 years...

**03:20** ...is linked to many of the same kinds of things that you're starting to see now.

**03:24** The key is parametric information, viewshed analysis.

**03:28** Anytime we've got two different apples and oranges that we can systematically link them...

**03:33** ...it totally changes the negotiation approach to the whole process, and as much immersive, full-range, peripheral vision...

**03:44** ...engaging the whole visual cortex in helping to come through this and allowing people to do it themselves.

**03:50** And it all stems back to early work we were doing in the '90s of using ArcInfo as the driver to automate tools...

**03:56** ...with Eckert Lange, Willie Schmidt at ETH, and Ziggy Lange, and we collaborated for a number of years...

**04:05** ...in bringing these tools together to automate getting the representations that were adequate.

**04:09** Then we needed them to work parametrically. We needed to be able to integrate all of these tools.

**04:15** And we've got those now.

**04:17** And lately, I've been working on places that we reinforced the urban forest in Toronto for urban heat island change.

**04:24** The team right now is really exciting, because now I get to work with the best transportation modeler in our region...

**04:31** ...Eric Miller, and Stephen Sheppard at UBC is doing a similar thing in this study through GEOIDE...

**04:37** ...which is the National Center of Excellence in Canada for geomatics.

**04:41** So we're trying to link these things together.

**04:44** The specific case I'll show you right now is one that came up in this project.

**04:49** Esri is one of our partners in...industrial partners in the project.

**04:53** So our focus right now, and we need as much help in this as possible, is adapting...

**04:58** ...taking from our prototyping environment the lessons we've learned about doing these things...

**05:02** ...and taking three key areas of parametric and modeling approaches.

**05:07** One is the traditional urban design one that I've worked in.

**05:11** The other is taking carbon analysis and energy analysis models in Excel spreadsheets.

**05:18** And, the third one is taking Eric Miller's agent-based, microagent-based simulation models...

**05:25** ...of predictive behavior of people in the region in their transportation.

**05:29** So this...this is the thing that Bill Miller's group and Matthew Baker helped us put together about four weeks ago...

**05:37** ...and we're right in the midst of trying to bring this together for the West Don Lands.

**05:41** It's this classic area on the waterfront international competitions.

**05:45** It's been designed from that urban design approach.

**05:49** But at the same time, they did this carbon energy analysis.

**05:52** So we're taking the elements of traditional CAD models. No one's done this parametrically yet...

**05:57** ...bring the parametric models together with these types of information, and with Eric led part of that work...

**06:04** ...developing the spreadsheet, the Clinton Foundation has been behind part of this.

**06:08** So part of our hope is to take that, that model and integrate it with ArcGIS 10 and cross these scales that we're looking at.

**06:16** The information that each of these elements of the model requires come to us from different scales.

**06:23** So that...that's the one component I mentioned there. I'm adapting that work.

**06:25** Eric Miller's taking his traffic model, and what you see here is the first bit we got out of that test of using the physical model...

**06:33** ...to drive some of the area parameters and the population in the development, and then this is the prediction of where those...

**06:41** ...we would expect those people to be working...

**06:43** ...and what part of the transportation network in the region they would be going to.

**06:47** So these are the downtown people who are actually living across the region in order to have their work patterns.

**06:54** And then this key...really interesting energy...energy and carbon analysis tool that Eric put together...

**07:01** ...and linking that into the model is our...is where we're at at this point, and that's the next stage is linking these together.

**07:10** So, and that's this model here of the workflow we're working on at the moment.

**07:14** And this is one of our first stages of elaborating that.

**07:18** The 3D model is now at the point where it will drive the numbers feeding to the spreadsheet, or vice versa...

**07:25** ...and then the trans...and you're seeing some of the impact of populations and...

**07:30** ...household users in the...the 3D model applied across the region.

**07:36** And then we add the Flex dashboards we've been doing in the heat island work applied to provide some of this kind of feedback to us.

**07:44** And the other case we'll do more work on after is the Pearson Airport zone, heat island applied across industrial zones...

**07:51** ...and an urban agricultural strategy for mitigating that heat island effect is one of the schemes as an example we're working with.

**07:59** And then, again, the dashboards for that scale.

**08:03** I think those...that's sort of the stage our work is at, and I came in part to get as much input from other people...

**08:09** ...that we might have at the break sessions about what we do next in adapting from our research prototypes and...

**08:15** ...trying to bring the lessons we've learned in these three areas together around the latest tool sets. Thank you.