### Honoring Beale Medalist Dr. Ailsa Land Real-World Optimisation Models: Successes and Pitfalls

### Anna Nagurney

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February 25, 2021

Anna Nagurney Beale Medal Panel in Honor of Dr. Ailsa Land

# Dr. Ailsa Land Is Interviewed by Professor László Végh

In July 2019, Professor Emeritus Land was interviewed by LSE Professor Végh, as part of the INFORMS History and Traditions series on Oral Histories. She was the first female thus honored.



Click here to view the interview video and transcript.

In this very interesting and panoramic interview she notes, among others, John Murchland, whose work on the Braess Paradox I've cited, saying: "So John Murchland and I came to an agreement. He would teach me Fortran while I would teach him how to solve an LP using Fortran."

# Some Quotes of Professor Land's from the Interview

• "I cannot see that an objective function which is just profit makes any sort of sense at all. It's not the way a world should be run."

• "And as you know, you have to publish. It's publish or perish, isn't it?" ... "Very good at inventing new things, but didn't want to think anything through to the end."

• "But if you want my basic opinion about OR is that it was great for wartime."

Although we are not officially "at war," various officials have stated that now "we are at war with the coronavirus."

The COVID-19 pandemic has spurred mobilization on an international scale not seen since WWII 80 years ago. OR played an essential role in WWII and is again engaged in intense scientific efforts with high stakes, with expectations of helping in response, mitigation, and recovery.

## Response of the OR Community to COVID-19

Our profession has responded also in a substantive way through offering advice to governments as well as impacts on policy.

Fueled by a passion to assist, there have been innovations in supply chain network modeling, game theory, cold chain vaccine logistics, hospital capacity, as well as other related areas. The research has garnered attention.

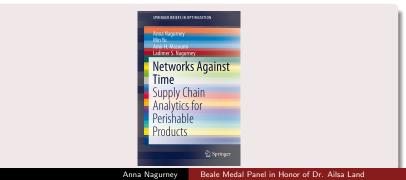


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# Response of the OR Community to COVID-19

Our research on perishable and time-sensitive product supply chains, in which utilize results from physics, chemistry, biology, and medicine in order to capture the perishability of various products over time from healthcare products such as blood, medical nucleotides, and pharmaceuticals, as well as vaccines, to food, has been especially relevant in the pandemic. We have also worked on multiple extensions, including the incorporation of the critical resource that is labor.



## Writing OpEds

On March 11, 2020 the WHO declared the pandemic. On March 12 my article on blood supply chains in *The Conversation* appeared and, on March 24 my article in INFORMS *Analytics Coronavirus Chronicles*.



How coronavirus is upsetting the blood supply chain



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The coronavirus, which causes the disease COVID-19, has created enormous

anxiety, uncertainty, and disruption to our lives. Much has already been written about potential shortages of medicines and face masks, but little has been said

about potential shortages of <u>medicines</u> and <u>lace masss</u>, but little has been about something only you and I can provide – lifesaving blood.

Our nation's blood supply is essential to our health care security. Blood transfusions are integral parts of major superises. Blood is used in the treatment of diseases, particularly siddle cell anemia and some cancers. Blood is needed for virticms who have liquired sourced particulars or natural diseases. Eggergdig, the U.S. needs 80,000 units of red blood cells, 7,000 units of plateless, and 10,000 units of platma.

Lama professor and director of the Virtual Center for Supernetworks at the University of Massachusettis Amherst: Become of the exclusing commutinus. health care crisis, I am deeply concerned the USA, blood supply chain is under stress. The timing could Intrily be worse, the COVID-19 outbreak coincides with our seasonal Bus and colds.

#### Patients need blood in many states

Many states, including Washington, California Kamas, Pennsylvania, the, Canolinas, Manaschusetts and Rhode Island, are now calling for blood domations. At the same time, some states are closing schools and other sites that trypically host mobile blood drives; even prior to the coronarium, some events had been curvede. In Maxenhusetts, the Red Cross announced has Secondered in would no

### Analytics

### The COVID-19 Pandemic and the Stressed Blood Supply Chain



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Even in the best of times, the complex blocd supply chain in the United States is under stress. Although 38% of the U.S. population in eligible to domine blood, lists than 10% establig does as or a year. Furthermore, issues of sessonality core into pay with it and oriolic outing disordisor, the some for waither-elevide vertex that obliotisys. To further complicate matters, blood is perishable, planlets list five days and red blood cells have a shift life of 42 days.

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China, specifically Wuhan where the coronavirus is generally thought to have originated, blood donations have

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# Writing OpEds

### On August 4, 2020, I published an article in The Conversation,

"The Raging Competition for Medical Supplies is not a Game, but Game Theory Can Help."



On September 18, 2020, I published another article in *The Conversation*,

"Keeping Coronavirus Vaccines at Subzero Temperatures During Distribution Will Be Hard, but Likely Key to Ending Pandemic."

## Coverage by the Media During the Pandemic



On April 22, 2020, a letter from California Attorney General Xavier Becerra to the Admiral Brett Giroir, the Assistant Secretary of the US Department of Health & Human Services, and signed by US Attorney Generals of 21 other states, requested updates, because of the pandemic blood shortages, to blood donation policies that discriminate.

My March 12 article in *The Conversation*, which was reprinted in LiveScience, was the first reference and was cited on the first page.

### Impacting Policy Through OR and Analytics



State of California Office of the Attorney General Xavier Becerra Arronney General

April 22, 2020

#### Via Electronic Mail

The Honorable Admiral Brett Giroir, MD Assistant Secretary for Health U.S. Department of Health & Human Services Mary E. Switzer Building 330 C Street SW, Room L600 Washington, DC 20024 Attu: ACBTSA@APAHPAIASee, 209 ACBTSA@Abs.gov

#### RE: "Solicitation for Public Comments on Section 209 of the Pandemic and All-Hazards Preparedness and Advancing Innovation Act." 85 Fed. Reg. 16.372 (March 23, 2020)

Dear Assistant Secretary Giroir:

The undersigned State Alterneys General frem California, Colerada, Connecticat, Delavaras, the District of Columbia, Havini, Illinois, Joux, Maine, Masachusetta, Kheighan, Minnesota, Nevada, New Jeney, New Mexico, New York, Oregon, Pennylvania, Vermont, and Vigrinia submit hist letter in response to the folcard government" "Solicitation for Public Comments on Section 209 of the Pandemis and All-Hazards Preparedness and Advancing Imovation Act, "QFS ed. Reg. [3:27]. We support the Office of the Assistant Secteratry for Health in the U.S. Department of Health and Human Services' (HIB) efforts and work in maintaining an adequent antional Nodo supply during the COVID-19 pandemic.

An adequate blood supply is critical to the nation's healthcare. Blood transfusions and blood products are needed for major surgeries, to treat diseases such as sickle cell anemia and some cancers, and to treat victims who have injuries caused by accidents or natural disasters.<sup>1</sup> Every day, the United States needs approximately 36,000 units of red blood cells, nearly 7,000

<sup>&</sup>lt;sup>1</sup> Anna Nagumey, How Coronavirus is Upsetting the Blood Supply Chain, Live Science (Mar. 13, 2020), https://www.livescience.com/coronavirus-blood-supply-chain.html/.

### Impacting Policy Through OR and Analytics

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Professor Land, towards the end of her interview with Professor Végh, says: "But in terms of what I have achieved as a lifetime, have I left the world in any sense better by doing what I did, I think the answer is no. Might I have done better if I'd lived amongst the economists and had some effect there? I don't know."

Professor Land, you have made an immense impact on the field of OR and on the practice of OR, and today we all thank you and salute you! We will make sure that the contributions of those working in OR will continue to make a positive difference.