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|  FLORIDA ATLANTIC UNIVERSITY | NEW COURSE PROPOSAL Graduate Programs | | UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____ |
| | Department School of Urban and Regional Planning College College for Design and Social Inquiry <i>(To obtain a course number, contact erudolph@fau.edu)</i> | | |
| Prefix URP Number 6719 | <i>(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)</i> Lab Code | Type of Course <input type="text" value="Lecture"/> | Course Title Shared and Automated Transport: The Future of Urban Mobility |
| Credits <i>(Review Proposal Memorandum)</i> 3 | Grading <i>(Select One Option)</i> Regular <input checked="" type="radio"/> Sat/UnSat <input type="radio"/> | Course Description <i>(Syllabus must be attached; see Guidelines)</i> The Future of Urban Mobility will engage students with the current state of knowledge regarding shared and automated transport modes, drawing from information about current professional practices as well as the research literature. As a seminar-style course, students will become acquainted with research methods and how they can be used to inform our understanding of emerging policy and planning issues surrounding new transportation modes. | |
| Effective Date <i>(TERM & YEAR)</i> Fall 2020 | Prerequisites None | | Corequisites None |
| Registration Controls <i>(Major, College, Level)</i> | | | |
| <i>Prerequisites, Corequisites and Registration Controls are enforced for all sections of course</i> | | | |
| Minimum qualifications needed to teach course: Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.) | | List textbook information in syllabus or here Sperling, D. (2018). Three revolutions: Steering automated, shared, and electric vehicles to a better future. Washington DC: Island Press. | |
| Faculty Contact/Email/Phone Louis Merin, lmerin@fau.edu, 561-297-4166 | | List/Attach comments from departments affected by new course | |

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| Approved by Department Chair <u>Steven Coburn</u> College Curriculum Chair <u>Dr. Arthur J. Semerelli</u> College Dean <u>Maekya Luna</u> UGPC Chair <u>Adrienne Penabaz</u> UGC Chair <u>FAU/PS</u> Graduate College Dean <u>Robert Johnson</u> UFS President _____ Provost _____ | Date <u>1/22/2020</u> <u>1/29/2020</u> <u>2/26/20</u> <u>2/20/2020</u> <u>3-2-2020</u> |
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Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

Shared and Automated Transport: The Future of Urban Mobility URP 6719

Syllabus last updated January 22, 2020

Basic Course Information

The Future of Urban Mobility

Urban and Regional Planning 6719

Credit Hours: 3

Mondays 6:30-9:20 PM

Classroom: 285 Social Sciences (SO 44)

Spring 2020, Jan. 11th – May 8th

Primary Instructor:

Louis A. Merlin, Ph.D., AICP

lmerlin@fau.edu

Office Phone: 7-4166

Office: 284I, College of Design and Social Inquiry (SO)

Office Hours: Fridays 2:30-4:00 PM or by appointment

Course Description and Goals

The Future of Urban Mobility will engage students with the current state of knowledge regarding shared and automated transport modes, drawing from information about current professional practices as well as the research literature. As a seminar-style course, students will engage in readings, discussions, and presentations to learn about these new modes and grapple with the emerging policy and planning issues surrounding them.

Shared modes include car sharing, bike sharing, ride sourcing/ride hailing, ride sharing, demand responsive transit, and more. Automated modes include semi-automated and fully automated vehicles (self-driving cars, but also self-driving buses, etc.) operating on public roadways or on dedicated guideways. We will also discuss connected vehicles, where vehicles transmit real-time information to each other and to surrounding infrastructure to improve safety and traffic flow.

Topics will include trends in shared and automated mobility, their observed and expected impacts on the transportation system and the environment, and the potential integration of these new modes with public transit.

As an advanced, seminar-style course, students will have the opportunity to engage directly with and critique the research literature. Students will develop a detailed case study of an existing shared mode and present the results of their case study to the class. Students will also address a research question of their own choosing through a semester-length term paper.

The goals of the Future of Urban Mobility course are:

- Learn about the current state of emerging shared transportation modes, including operational and user characteristics

- Learn about the current state and anticipated future state of automated and connected transport modes
- Understand the range of potential implications of shared and automated modes in terms of the sustainability and environmental impacts
- Identify and discuss the policy and planning challenges surrounding shared and automated modes
- Learn about and practice various methods for designing, analyzing, and influencing the future
- Apply appropriate quantitative and qualitative methods in researching existing transportation systems
- Develop research skills for independent inquiry into transportation operations and/or policy issues
- Discuss economic, social, and cultural factors in urban growth and change in relation to emerging transportation technologies and systems

Required Text

Sperling, D. (2018). Three revolutions: Steering automated, shared, and electric vehicles to a better future. Washington DC: Island Press.

Course Policies

Attendance Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.

Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

Cell phone and laptop use during class time is not permitted, except when these resources are being used for a specific in-class exercise. We need you to be fully present to improve the learning experience for everyone. Your ideas are important and so I need you to be fully engaged during class time.

Complete all reading assignments in advance of the class. As a seminar-based course, we cannot have productive dialogue unless everyone has completed the readings in advance.

All assignments should be turned in on time or your grade will be penalized. Homework assignments will be penalized one letter grade per day late, with the first late day beginning at the time when the assignment is due. If an assignment is 10 days late, it automatically becomes a 0. If you know you

cannot meet a deadline, you should inform me well in advance and make a specific proposal about when you can complete the assignment by. I will allow for a certain amount of flexibility for those who plan and notify me in advance of difficult scheduling situations.

Respect for Diversity Statement

Our classroom and our university should always be spaces of mutual respect, kindness, and support for individuals regardless of race/ethnicity, nationality, gender, class, sexuality, religion, culture, age, or ability. It is expected that this be demonstrated in all written and verbal communications from the instructor to all students, from all students to their instructor, and between all students in the course.

Freedom from Discrimination, Harassment, and Violence

Should you ever need assistance or have concerns about discrimination, harassment, or violence, please access the resources available to you on campus. Please note that, because FAU faculty are considered “responsible employees” by the Department of Education, any disclosure of gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member must be reported by that faculty member to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: <http://www.fau.edu/eic/title-ix/>.

Communication with the Instructor

All communications with the instructor (and with other students) should be professional in tone. Address people by their name (and title where appropriate), use complete sentences, and take the time to use correct grammar in email exchanges.

Please do not assume I am on call all day and night to answer questions! In general, I will respond to email inquiries within 24 hours. Before assignment deadlines and tests, I will try to respond to queries submitted before 9 PM on the day before these come due.

In addition, I am happy to meet with students to talk about general professional and academic concerns beyond the scope of this course during office hours. When we are talking about material outside the course, you may address me more informally.

Accommodation for Students with Disabilities

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

It is a goal of this class to ensure that all students are encouraged to participate and engage as fully as possible. Therefore, if you have a physical or learning disability that requires accommodations, please let me know.

Religious Observances

If you have a religious observance that conflicts with required course activities, please let me know as soon as possible.

Mental Health

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

If you are unsure of where to seek help, please feel free to ask me and I will help you find the right venue for assistance. If you are undergoing a mental health issue and personal crisis and it is affecting your work in this course, please let me know in a way that is comfortable for you. You do not have to share the personal details of your situation to let me know that family or outside personal issues are impacting your ability to perform in this class.

Academic Integrity

Your assignments should be predominantly written in your own words. If you use outside sources of information for ideas of information, they should be cited. If you use sentences or significant portions of words taken verbatim from sources, they must be quoted and cited.

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high-quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see the Code of Academic Integrity in the University Regulations at

<http://www.fau.edu/regulations/chapter4/4.001 Code of Academic Integrity.pdf>.

Outside of exams, all assignments are “open book” and you may discuss them with anyone, including the primary instructor, in order to solicit general ideas and advice. You may discuss with your fellow students, how to approach an assignment, what data sources to use, what steps to pursue in data analysis, and so forth.

If you are unsure if your approach to an assignment or a test constitutes academic dishonesty, please consult with the instructor.

Assignments and Grading

Your grade will be comprised of the following:

| Grade Component | Percentage |
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| Participation | 20% |
| Reading Summaries | 20% |
| Shared Mobility System Paper and Presentation | 30% |
| Term Paper | 30% |
| Total | 100% |

Participation will be graded through attendance and participation in course discussions.

Every student will hand in 14 **Reading Summaries** during the course. Any assigned readings of **5 pages or more** can be the subject of a reading summary. Reading summaries must be printed and handed in at the start of class, though you should bring a second copy to refer to during class. Reading summaries should pay special attention to the research method used and its limitations.

The **Shared Mobility System Presentation** will be a presentation of an existing shared mobility system based upon your research. Primary research (i.e. a site visit) and secondary research should be completed where possible. The goal is to provide an overview of the current state of a shared mobility services and its opportunities and challenges for the future. A short written report should accompany the presentation.

The **Term Paper** will be a research paper conducted over the course of the entire term investigating a research question of the student's choice. A literature review to assess the current state of knowledge is required. Students must also lay out a research plan for gathering additional information beyond what is already known in their term paper.

Grading Policy

The primary purpose of grades is to provide you feedback so that you can become better at what you do!

If you want to become better at your work, you will continue to seek feedback and consider it thoughtfully over the course of your entire career. None of us ever reach perfection, and we can always perform better at some aspect of our work. Handling constructive criticism with poise is one of the most important marks of a mature professional.

Grading

Grades will be out of 100 possible points for the Homework, Midterm, and Final. The grade will be created by subtracting off points for each missing and/or incorrect item.

The Meaning of Letter Grades

The grading scheme:

A is for high quality, professional work. This work would satisfy a client or a supervisor in a work setting.

B is the grade for work which mostly meets expectations but is not fully up to professional quality. B+ indicates above average and B- indicates below average.

C is offered when the assignment has been completed but is lacking in some important aspect. For example, the writing is difficult to understand, or the presentation is disorganized, or perhaps an important table shows incorrect statistics.

D reflects a serious shortfall in meeting the assignment's expectations.

F is usually possible only if nothing is handed in, or if it is handed in so late as to be irrelevant. This grade may also be used for work that does not meet basic college-level requirements, i.e. it is not readable.

Schedule

| Date | Topic | Readings and Assignments |
|-------|--|---|
| 01/13 | History and Definitions for Shared Mobility Research Methods for The Future of Mobility | Dewey Rayle 2016 Lindsay 2018 SUMC 2015 pp. 3-16 SUMC 2017 (webpage) |
| 01/20 | MLK Holiday | |
| 01/27 | Vehicle Electrification | Three Revolutions, Chapter 2. Electric Vehicles |
| 02/03 | Introduction to Vehicle Automation | Three Revolutions, Chapter 4. Vehicle Automation Chronin 2016 (slides) Hughes 2017 Madrigal 2014 SAE International 2018 |
| 02/10 | Transportation Network Companies/ Ride-Hailing | Three Revolutions, Chapter 3. Shared Mobility Clewlow Mishra 2017 Conway Salon 2018 Davidson 2017 Schneider 2019 Scott 2016 |
| 02/17 | Bike Sharing and Micromobility | Chardon et al 2017 DePuis Greiss 2019 CityLab – The Bike Share Boom (webpage) Cohen 2017 |
| 02/24 | Public Transit and New Mobility | Three Revolutions, Chapter 5, Transit Crist 2017 Hanna 2018 Webinar TCRP Research Report 204 Transit and TNC partnerships Woodman 2016 |
| 03/02 | Public Policies for Shared and Automated Mobility | Three Revolutions, Chapter 6. Equity NACTO 2017 (Data sharing) NACTO 2018 (Shared active transportation) Shaheen Cohen 2018 Small Bliss 2019 SUMC 2017 (Twin Cities Plan) Zipper 2018 |
| 03/09 | Spring Break | |

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| 03/16 | Transition to AVs; Public Opinion | Bansal Kockelman 2017 Haboucha Ishaq 2017 Litman 2014 Schoettle Sivak 2016 |
| 03/23 | AVs and Safety | Bliss 2018 Kalra 2016 USDOT ITS JPO Connected Vehicle Webpage + Videos US ITS JPO 2016 (Connected Vehicle Pilot Study) US ITS JPO 2017 (DSRC Fact Sheet) |
| 03/30 | Shared Automated Vehicles | Fagnant Kockelman 2018 Merlin 2019 Viegas Martinez 2016 |
| 04/06 | Environmental Impacts | Haley Kwok 2017 Wadud Marsden 2017 Rodier 2018 |
| 04/13 | Future for AVs/ Scenario Thinking | Calthorpe Walter 2017 Fulton Mason 2018 Roustan 2018 Whittle 2017 Townsend 2016 |
| 04/20 | Congestion | Atkins 2016 Bliss 2017 Dougherty 2017 Hensher 2018 Shared Mobility Report Due |
| 04/27 | Student Presentations | Shared Mobility Presentation Due Term Paper Due |

Bibliography

- Bansal, P., & Kockelman, K. M. (2017). Forecasting Americans long-term adoption of connected and autonomous vehicle technologies. *Transportation Research Part A: Policy and Practice*, 95, 49–63. <http://doi.org/10.1016/j.tra.2016.10.013>
- Bliss, L. (2017, May). Even Shared Autonomous Vehicles Could Spell Traffic Disaster. *The Atlantic*, 1–4.
- Bliss, L. (2018, March). Former Uber Backup Driver: ' We Saw This Coming '. *CityLab*. Retrieved from www.citylab.com
- Chardon, C. M. de, Caruso, G., & Thomas, I. (2017). Bicycle sharing system 'success' determinants. *Transportation Research Part A: Policy and Practice*, 100, 202–214. <http://doi.org/10.1016/j.tra.2017.04.020>
- Cronin, B. (2016). *Vehicle Based Data and Availability*. Research and Innovative Technology Administration, USDOT.
- CityLab. (2018). The Bike Share Boom. Retrieved from <https://www.citylab.com/city-makers-connections/bike-share/>
- Clewell, R. R., & Mishra, G. S. (2017). Disruptive transportation: The adoption, utilization, and impacts of ride-hailing in the United States (No. UCD-ITS-RR-17-07). Institute for Transportation Studies, University of California, Davis.
- Cohen, J. (2017, June 27). New Look at Philly, Chicago and NYC Shows Path to Bike-Share Equity. *Next City*, pp. 27–30.
- Conway, M., Salon, D., & King, D. (2018). Trends in Taxi Use and the Advent of Ridehailing, 1995–2017: Evidence from the US National Household Travel Survey. *Urban Science*, 2(3), 79. <https://doi.org/10.3390/urbansci2030079>
- Crist, P. (2017). *Shaping the relationship between public transport and Innovative Mobility*. <http://doi.org/10.1787/24108871>
- Davidson, F.T. (2017, October). If You Drive Less Than 10,000 Miles a Year, You Probably Shouldn't Own a Car. *CityLab*. 1–11.
- DuPuis, N., Griess, J., & Klein, C. (2019). Micromobility in Cities. A History and Policy Overview. National League of Cities, 1–30.
- Dewey, O., & Rayle, L. (2016). How Ridesourcing went from Rogue to Mainstream in San Francisco. Cambridge, MA. Retrieved from <http://research.gsd.harvard.edu/tut/files/2016/06/San-Francisco-Case-2016.pdf>
- Dougherty, C. (2017, March 8). Self-Driving Cars Can't Cure Traffic, but Economics Can. *The New York Times*, pp. 8–11. Retrieved from <https://nyti.ms/2mEs8Ms>

- Fagnant, D. J., & Kockelman, K. M. (2018). Dynamic ride-sharing and fleet sizing for a system of shared autonomous vehicles in Austin, Texas. *Transportation*, 45(1), 143–158. <http://doi.org/10.1007/s11116-016-9729-z>
- Fulton, L., Mason, J., & Meroux, D. (2017). *Three Revolutions in Urban Transportation*. Retrieved from <https://www.itdp.org/wp-content/uploads/2017/04/ITDP-3R-Report-FINAL.pdf>
- Haboucha, C. J., Ishaq, R., & Shiftan, Y. (2017). User preferences regarding autonomous vehicles. *Transportation Research Part C: Emerging Technologies*, 78, 37–49. <http://doi.org/10.1016/j.trc.2017.01.010>
- Haley, B., Kwok, G., & Jones, R. (n.d.). Case Study: Passenger Transportation Innovation Study From Risk to Return : Investing in a Clean Energy Economy, 1–18.
- Hensher, D. A. (2018). Tackling road congestion - What might it look like in the future under a collaborative and connected mobility model? *Transport Policy*, 66(February), A1–A8. <http://doi.org/10.1016/j.tranpol.2018.02.007>
- Henaghan, J., & Rouse, D. C. (2018). *Preparing communities for autonomous vehicles*.
- Hernandez, M., Eldridge, R., & Lukacs, K. (2018). *Public Transit and Bikesharing*. National Academies Press. <http://doi.org/10.17226/25088>
- Hughes, J. (2017). Waymo Is Already Running Self-Driving Cars With No One Behind the Wheel. *The Drive*, 1–8. Retrieved from <http://www.thedrive.com/tech/15848/waymo-is-already-running-cars-with-no-one-behind-the-wheel>
- Kalra, N. (2016). Shaping the Future of Autonomous Vehicles How Policymakers Can Promote Safety, Mobility , and Efficiency in an Uncertain World. In *Senate Appropriations Committee, Subcommittee on Transportation, Housing and Urban Development, and Related Agencies*. RAND. Retrieved from <https://www.rand.org/pubs/testimonies/CT459.html>
- Lindsay, G. (2018). The State of Play: Connected Mobility + U.S. Cities. How next generation transportation is shaping cities. CityLab Insights, (July). Retrieved from https://cdn.theatlantic.com/assets/media/files/citylab_insights_connected_mobility.pdf
- Litman, T. (2014). Autonomous Vehicle Implementation Predictions: Implications for Transport Planning. *Transportation Research Board Annual Meeting*, 42(2014), 36–42. <http://doi.org/10.1613/jair.301>
- Madrigal, A. C. (2014). The Trick That Makes Google’s Self-Driving Cars Work. *The Atlantic Media Company*, pp. 1–11.
- NACTO. (2017). *City Data Sharing Principle: Integrating New Technologies into City Streets*. New York, NY.
- Rodier, C. (2018). *The Effects of Ride Hailing Services on Travel and Associated Greenhouse Gas Emissions*.

- Roustan, W. K. (2018, January 19). Self-driving cars will alter South Florida's roads. Here's how. *Sun Sentinel*, pp. 1–3. Retrieved from <http://www.sun-sentinel.com/news/transportation/fl-reg-self-driving-road-plans-20180118-story.html>
- SAE International. (2018). J3016: Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles. Retrieved from https://www.sae.org/standards/content/j3016_201806/
- Schneider, T. W. (2018). Taxi, Uber, and Lyft Usage in New York City. Retrieved May 25, 2018, from <http://toddschneider.com/posts/taxi-uber-lyft-usage-new-york-city/>
- Schoettle, B., & Sivak, M. (2016). *Motorists Preferences for Difference Levels of Automation 2016* (No. Report No. SWT-2016-8). Ann Arbor, Michigan.
- Scott, M. (2016, October 31). Study Finds Some Uber and Lyft Drivers Racially Discriminate. *The New York Times*, pp. 9–11. Retrieved from <http://nyti.ms/2dVyT9f>
- Shaheen, S., & Cohen, A. (2018). *Shared Mobility Policies for California*. UC Berkeley Policy Briefs. <http://doi.org/10.7922/G2VX0DP9>
- SUMC. (2015). Shared-Use Mobility Reference Guide. *Shared-Use Mobility Center*. Retrieved from http://sharedusemobilitycenter.org/wp-content/uploads/2015/09/SharedUseMobility_ReferenceGuide_09.25.2015.pdf
- SUMC. (2017). Why SUMC Supports Shared Mobility Principles for Livable Cities. Retrieved from <http://sharedusemobilitycenter.org/news/why-sumc-supports-shared-mobility-principles-for-livable-cities/>
- SUMC. (2017). *Twin Cities Shared Use Mobility Action Plan*.
- Transportation Research Board. (2019). TRB Webinar: Partnerships Between Transit Agencies and Transportation Network Companies. Retrieved November 26, 2019, from <http://www.trb.org/Main/Blurbs/179219.aspx>
- Townsend, A. (2014). *Re-Programming Mobility: The Digital Transformation of Transportation in the United States* (Vol. 26). <http://doi.org/10.1002/germ.201490013>
- USDOT ITS JPO. (2018). Connected Vehicles. Retrieved May 25, 2018, from https://www.its.dot.gov/research_areas/connected_vehicle.htm
- Viegas, J., Martinez, L., Crist, P., & Masterson, S. (2016). Shared Mobility. Innovation for Livable Cities. *International Transport Forum's Corporate Partnership Board*, 1–56. <http://doi.org/http://dx.doi.org/10.1787/5jlwvz8bd4mx-en>
- Wadud, Z., & Marsden, G. (2016). Self-Driving Cars. Will They Reduce Energy Use? *Mobility & Energy Futures Series*. Retrieved from

http://www.its.leeds.ac.uk/fileadmin/documents/research/MobilityEnergyFutures_-_SelfDrivingCars.pdf

Walters, J., & Calthorpe, P. (2017). Autonomous vehicles: hype and potential. *Urban Land*, 76(1), 58–62. Retrieved from <https://urbanland.uli.org/industry-sectors/infrastructure-transit/autonomous-vehicles-hype-potential/>

Whittle, R. (2017). Soon you'll be able to go to work in a flying taxi. *New York Post*, 1–5.

Woodman, S. (2016, September). Welcome to Uberville. *The Verge*. Retrieved from <http://www.theverge.com/2016/9/1/12735666/uber-altamonte-springs-fl-public-transportation-taxi-system>

Zipper, D. (2018). Who Owns Urban Mobility Data? *City Lab*, 1–6.

Zmud, J., Goodin, G., Moran, M., Kalra, N., & Thorn, E. (2017). *Advancing Automated and Connected Vehicles: Policy and Planning Strategies for State and Local Transportation Agencies*. National Academies Press. <http://doi.org/10.17226/24872>