Linguistics

Courses offered by the Department of Linguistics are listed under the subject code LINGUIST on the Stanford Bulletin’s ExploreCourses web site.

Linguistics is the study of language as a fundamental human activity. Linguists consider language as a cultural, social, and psychological phenomenon and seek to determine what is universal to all languages and what is specific to individual languages, how language varies across individuals and communities, how it is acquired, how it changes, and how it is processed by humans and machines. Linguistics is an inherently interdisciplinary field that links the humanities, the social sciences, and the other cognitive sciences, as well as computer science, education, and hearing and speech sciences.

The department offers courses at the undergraduate and graduate levels. Some focus on analyzing structural patterns of sounds (phonetics and phonology), meanings (semantics and pragmatics), words (morphology), sentences (syntax). Others examine how these structures vary over time (historical linguistics), or over individuals and social groups (sociolinguistics), or how language is processed and learned by humans (psycholinguistics and language acquisition) or by computers (computational linguistics).

A variety of open forums provide for the discussion of linguistic issues, including colloquia and regularly scheduled workshops in child language, computational linguistics, phonetics and phonology, psycholinguistics, semantics and pragmatics, sociolinguistics, and syntax and morphology.

Mission of the Undergraduate Program in Linguistics

The mission of the undergraduate program in Linguistics is to provide students with basic knowledge in the principal areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics, historical linguistics, sociolinguistics, psycholinguistics, and computational linguistics) and the skills to do more advanced work in these subfields. Courses in the major also involve interdisciplinary work with connections to other programs including anthropology, communication, computer science, education, foreign languages, psychology, and symbolic systems. The program provides students with excellent preparation for further study in graduate or professional schools as well as careers in business, government agencies, social services, and teaching.

Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department’s undergraduate program. By the end of the program, students are expected to be able to:

1. formulate theoretically interesting and tractable research questions;
2. find and collect information relevant to answering their research questions;
3. bring linguistic theory to bear in analyzing and evaluating information;
4. articulate the questions and outcomes of the process described in 1-3; and
5. engage with peers in an intellectual community around linguistic issues.

Graduate Programs in Linguistics

The department offers an M.A., Ph.D., and Ph.D. minor in Linguistics.

Learning Outcomes (Graduate)

The purpose of the master’s program is to develop students’ knowledge and skills in Linguistics and to prepare them for a professional career or doctoral studies. This is achieved through completion of courses, including course work in an area of specialization within the field, and experience with independent research.

The Ph.D. is conferred upon candidates who have demonstrated the ability to conduct substantive, independent research in Linguistics. Through completion of advanced coursework and rigorous methodological and analytical training, the doctoral program prepares students to make original contributions to knowledge in linguistics, to articulate the results of their work, and to demonstrate its significance to linguistics and related fields.

Cognitive Science

Linguistics is participating with the departments of Philosophy and Psychology in an interdisciplinary program in Cognitive Science for doctoral students. The program is intended to provide an interdisciplinary education as well as a deeper concentration in linguistics. Students who complete the Linguistics and Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Linguistics.

To receive this designation, students must complete 30 units of approved course work. The 30 units cannot include courses counted elsewhere towards the Ph.D. Courses may be drawn from the participating departments, as well as from other departments, as long as their content is appropriate to the designation. At least 18 of the 30 units must be from outside the student’s major department and must include course work in at least two other departments. The majority of the courses taken towards the 30 units of coursework must be taken for a letter grade and should be completed with at least a ‘B’. Special topic seminars are excluded in favor of more foundational courses.

Linguistics Course Catalog Numbering System

Courses numbered under 100 are designed primarily for pre-majors. Courses with 100-level numbers are designed for undergraduate majors and minors; a limited number of 100-level units may apply to a master’s or Ph.D. minor. Those with numbers 200 and above are primarily for graduate students, but with consent of the instructor some of them may be taken for credit by qualified undergraduates. At all levels, the final two digits of the course number indicate a special area, as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Special Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>00-04</td>
<td>General</td>
</tr>
<tr>
<td>05-09</td>
<td>Phonetics</td>
</tr>
<tr>
<td>10-14</td>
<td>Phonology</td>
</tr>
<tr>
<td>15-19</td>
<td>Morphology</td>
</tr>
<tr>
<td>20-29</td>
<td>Syntax</td>
</tr>
<tr>
<td>30-39</td>
<td>Semantics, Pragmatics, Discourse</td>
</tr>
<tr>
<td>40-49</td>
<td>Language Acquisition, Psycholinguistics</td>
</tr>
<tr>
<td>50-62</td>
<td>Sociolinguistics, Language Variation, Change</td>
</tr>
<tr>
<td>63-73</td>
<td>Language and Culture, Structure of a Language</td>
</tr>
<tr>
<td>74-79</td>
<td>Methods, Mathematical Linguistics, Statistics</td>
</tr>
<tr>
<td>80-89</td>
<td>Computational Linguistics</td>
</tr>
<tr>
<td>90-99</td>
<td>Directed Work, Theses, Dissertations</td>
</tr>
</tbody>
</table>

Linguistics
Bachelor of Arts in Linguistics

The undergraduate major stresses the study of language both as a fundamental human faculty and as a changing social institution. At the core of the program is a set of departmental courses on the nature of human language; the major also draws on courses offered by other departments and programs.

The Linguistics major cuts across the humanities and the social and physical sciences. It provides a solid general education as a background for advanced studies in such disciplines as anthropology, cognitive science, communication, computer science, education (language, literacy, and culture), hearing and speech sciences, languages, law, linguistics, philosophy, and psychology.

Degree Requirements

Requirements for the B.A. include at least 55 units of course work; at least 28 of these units must be in Linguistics. The remaining units may be in Linguistics or in related fields, and should form a coherent program of study. Majors should discuss this course work with faculty and get specific approval from the Linguistics undergraduate adviser for courses outside the department.

Of the 55 units required for the major, no more than 12 units may be below the 100-level and no more than two courses may be taken on a credit/no credit basis (CR/NC). All required courses must be taken for a letter grade of ‘C-’ or better.

Required Courses:

Gateway Course
LINGUIST 196  Introduction to Research for Undergraduates (to be taken Autumn Quarter, junior year) 1

Capstone Course
LINGUIST 197A  Undergraduate Research Seminar (to be taken Winter Quarter, senior year) 2-3

Core Courses
Select at least one course each from two of the following three areas:

Phonetics and Phonology
LINGUIST 105  Phonetics 4
or LINGUIST 205A  Phonetics
LINGUIST 110  Introduction to Phonology 4

Morphology and Syntax
LINGUIST 121A  The Syntax of English 4
LINGUIST 121B  Crosslinguistic Syntax 4
LINGUIST 222A  Foundations of Syntactic Theory I 3-4

Semantics and Pragmatics
LINGUIST 130A  Introduction to Semantics and Pragmatics 4
or LINGUIST 230A  Introduction to Semantics and Pragmatics
LINGUIST 130B  Introduction to Lexical Semantics 3-4
LINGUIST 230B  Semantics and Pragmatics I 2-4
LINGUIST 232A  Lexical Semantics 2-4

Breadth Courses
Select at least one course each from two of the following four areas:

Historical Linguistics and Language Change
LINGUIST 160  Introduction to Language Change 2-4
LINGUIST 260A  Historical Morphology and Phonology 2-4
LINGUIST 260B  Historical Morphosyntax 2-4

Sociolinguistics
LINGUIST 150  Language and Society 4
LINGUIST 156  Language and Gender 4
LINGUIST 157  Sociophonetics
or LINGUIST 257  Sociophonetics
LINGUIST 250  Sociolinguistic Theory and Analysis 3-4

Psycholinguistics
LINGUIST 35  Minds and Machines 4
LINGUIST 140  Learning to Speak: An Introduction to Child Language Acquisition 4
LINGUIST 145  Introduction to Psycholinguistics 4

Computational Linguistics
LINGUIST 180  From Languages to Information 3-4
or LINGUIST 280  From Languages to Information
LINGUIST 188  Natural Language Understanding 3-4
or LINGUIST 288  Natural Language Understanding
LINGUIST 278  Programming for Linguists 1-4
LINGUIST 284  Natural Language Processing with Deep Learning 3-4

Depth Courses
Select at least two 200-level Linguistics courses. See ExploreCourses for current options.

Language Requirement

Linguistics majors must have competence in at least one language other than English as part of their understanding of the field of linguistics and its study. This requirement is fulfilled by completion of six quarters of language coursework at Stanford or by certification of equivalent proficiency through the Language Center (https://web.stanford.edu/dept/lc/language) or the relevant department (see University requirements). Majors may petition to be exempted from the language requirement if they have grown up speaking a language other than English and can use it for everyday purposes and for linguistic analysis.

Honors Program

Students who wish to undertake a more intensive program of study, including independent research, should pursue departmental honors. Students should apply for honors by the end of Spring Quarter of their junior year. As part of the application, the student must write a research proposal describing the honors project, which must be approved by the faculty adviser. Approval for honors is given only to students who have maintained a grade point average (GPA) of 3.3 (B+) or better in the courses required for the major.

Honors students complete a total of 65 units including the 55 units for the major, plus 10 additional units of Independent Study and Honors Research. In addition, they must complete an honors thesis based on research conducted with a principal adviser who must be a member of the Linguistics faculty, and a secondary faculty adviser who may, with the approval of the Linguistics Undergraduate Adviser, be a member of another department. In the Autumn Quarter of the senior year, honors students enroll in LINGUIST 199 Independent Study, to work closely with one of their advisers on the research project. In Winter and Spring quarters, honors students enroll in LINGUIST 198 Honors Research, with the student’s principal adviser for close supervision of the honors thesis. The thesis must be submitted in final, acceptable, form by May 15. The thesis topic is presented orally at a department Honors Colloquium late in Spring Quarter.
Joint Major Program in Linguistics and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (http://exploredegrees.stanford.edu/undergraduatesdegreesandprograms/#jointmajortext)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

Linguistics Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (http://exploredegrees.stanford.edu/schoolofengineering/computerscience/#jointmajorprogramtext)" section of this bulletin for details on Computer Science requirements.

All majors must take at least 50 units of course work in Linguistics and related fields, with no more than 12 units below the 100 level and at least 8 units above the 200 level. No more than two courses may be taken on a credit/no credit basis (CR/NC). All required courses must be taken for a letter grade of C- or better.

Students in the joint major must take LINGUIST 180/CS 124 as one of these breadth courses. Students may count LINGUIST 180/CS 124 towards both major requirements as long as the units are not double-counted. If LINGUIST 180/CS 124 is required for both Linguistics and a student’s specific CS track, Linguistics works with the student to identify another course (possibly independent study for 3-4 units) that would benefit the academic plan. (In this scenario, LINGUIST 180/CS 124 fulfills major requirements in both Linguistics and CS, but the units are only counted towards CS; additional units of work would be identified in Linguistics to meet the unit requirements.)

Within the 50-unit total, students in the joint major are encouraged to sign up for independent study units as part of completing the integrative capstone project. The expectation is that this project is supervised by a Linguistics faculty member. The specific number of units varies and is decided by the student and faculty adviser.

Different from Linguistics majors, CS + Linguistics joint majors are not required to display competence in a language other than English and therefore are not required to complete the equivalent of six quarters of language study.

Required Courses for the Joint Major:

Gateway Course

LINGUIST 196 Introduction to Research for Undergraduates (to be taken Autumn Quarter, junior year) 1

Capstone Course

LINGUIST 197A Undergraduate Research Seminar (to be taken Winter Quarter, senior year) 2-3

Core Courses

Select at least one course each from two of the following three areas:

Phonetics and Phonology

LINGUIST 105 Phonetics or LINGUIST 205A Phonetics 4
LINGUIST 110 Introduction to Phonology 4

Morphology and Syntax

LINGUIST 120 Introduction to Syntax 4
LINGUIST 121A The Syntax of English 4
LINGUIST 121B Crosslinguistic Syntax 4
LINGUIST 222A Foundations of Syntactic Theory I 3-4

Semantics and Pragmatics

LINGUIST 130A Introduction to Semantics and Pragmatics 4
LINGUIST 230A Introduction to Semantics and Pragmatics 4
LINGUIST 130B Introduction to Lexical Semantics 3-4
LINGUIST 230B Semantics and Pragmatics I 2-4
LINGUIST 232A Lexical Semantics 2-4

Breadth Courses

Select LINGUIST 180/280 plus at least one additional breadth course:

LINGUIST 180 From Languages to Information 3-4
LINGUIST 280 From Languages to Information 3-4

Historical Linguistics and Language Change

LINGUIST 160 Introduction to Language Change 2-4
LINGUIST 260A Historical Morphology and Phonology 2-4
LINGUIST 260B Historical Morphosyntax 2-4

Sociolinguistics

LINGUIST 150 Language and Society 4
LINGUIST 156 Language and Gender 4
LINGUIST 157 Sociophonetics or LINGUIST 257 Sociophonetics 1-4
LINGUIST 250 Sociolinguistic Theory and Analysis 3-4

Psycholinguistics

LINGUIST 35 Minds and Machines 4
LINGUIST 140 Learning to Speak: An Introduction to Child Language Acquisition 4
LINGUIST 145 Introduction to Psycholinguistics 4

Depth Courses

Select at least two 200-level Linguistics courses, taken for 4 units each (for a total of at least 8 units). See ExploreCourses for current options.

Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (https://stanford.box.com/change-UG-program) The Major-Minor and Multiple Major Course Approval Form (https://stanford.box.com/MajMin-MultMaj) is required for graduation for students with a joint major.

Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program (https://stanford.box.com/change-UG-program). Students may also consult the
Student Services Center (http://studentservicescenter.stanford.edu) with questions concerning dropping the joint major.

**Transcript and Diploma**

Students completing a joint major graduate with a B.A.S. degree. The two majors are identified on one diploma separated by a hyphen. There will be a notation indicating that the student has completed a "Joint Major." The two majors are identified on the transcript with a notation indicating that the student has completed a "Joint Major."

**Minor in Linguistics**

Requirements for the minor include at least 28 units of course work in Linguistics and related fields, approved in advance by the Linguistics undergraduate adviser. All courses must be taken for at least 3 units. No more than two courses may be taken on a credit/no credit basis (CR/NC). All required courses must be taken for letter grade of 'C-' or better. The courses counting towards the minor must be units beyond those needed to satisfy the student’s major course of study.

**Required Courses for the Minor:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINGUIST 1</td>
<td>4</td>
</tr>
<tr>
<td><strong>Phonetics and Phonology</strong></td>
<td></td>
</tr>
<tr>
<td>LINGUIST 105</td>
<td>4</td>
</tr>
<tr>
<td>LINGUIST 110</td>
<td>4</td>
</tr>
<tr>
<td><strong>Morphology and Syntax</strong></td>
<td></td>
</tr>
<tr>
<td>LINGUIST 120</td>
<td>4</td>
</tr>
<tr>
<td>LINGUIST 121A</td>
<td>4</td>
</tr>
<tr>
<td>LINGUIST 121B</td>
<td>4</td>
</tr>
<tr>
<td><strong>Semantics and Pragmatics</strong></td>
<td></td>
</tr>
<tr>
<td>LINGUIST 130A</td>
<td>4</td>
</tr>
<tr>
<td>LINGUIST 130B</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Select one of the following:

- LINGUIST 150 Language and Society 4 units
- or, in advance consultation with the Linguistics Undergraduate Adviser, a course in historical linguistics or the history of a language.

Remaining courses are to be determined in advance consultation with the Linguistics undergraduate adviser. Students are encouraged to take at least one 200-level Linguistics course. Students may also choose to do independent work with a faculty member of their choice.

**Master of Arts in Linguistics**

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (http://exploredegrees.stanford.edu/graduatedegrees)" section of this bulletin. The following are additional departmental requirements.

1. **Courses**—Individual programs should be worked out in advance with an adviser in Linguistics keeping the following requirements and guidelines in mind. The master's degree requires the completion of 45 units; at least 36 of these must be in Linguistics. The course work must include one introductory graduate-level course in each of the areas of syntax, semantics, and sound structure, as well as four courses in the student's area of specialization. If the student can make a compelling case, the department may allow up to 9 of the 45 units to be in a department other than Linguistics. Courses from outside the department must have clear linguistic content or contribute methodological knowledge that facilitates the thesis project; furthermore, if the student is simultaneously enrolled in a degree program in another department, not all of these 9 units can be earned in that department. No more than two courses should be at the 100 level. The majority of the courses taken towards the 45 units of degree program course work must be taken for a letter grade; these should include the three required introductory courses and the four courses constituting the specialization, which should all be completed with at least a 'B'. The overall course work grade point average (GPA) must be at least 3.0 (B).

2. **Thesis or Thesis Project**—A research paper supervised by a committee of three faculty (normally fulfilled by up to 6 units of LINGUIST 398 Directed Research).

**Coterminal Master's Degree Program in Linguistics**

The Department of Linguistics admits a limited number of undergraduates to the coterminal degree program. Students are required to submit to the department a complete application, which includes a statement of purpose identifying a thesis topic, a Stanford transcript, three letters of recommendation (at least one of which must be from a faculty member in Linguistics), and a proposed course of study (worked out in advance with a Linguistics adviser). Applicants for the coterminal degree may apply as early as their eighth quarter and no later than early in the eleventh quarter of undergraduate study. Decisions on admission to the coterminal degree program rest with the Graduate Admissions Committee of the Department of Linguistics.

**University Coterminal Requirements**

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (http://exploredegrees.stanford.edu/cotermdegrees)" section. University requirements for the master's degree are described in the "Graduate Degrees (http://exploredegrees.stanford.edu/graduatedegrees/#masterstext)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the graduate quarter are eligible for consideration for transfer to the graduate career. Students may request transfer of courses from the undergraduate to the coterminal degree program rest with the Graduate Admissions Committee of the Department of Linguistics.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the department by the end of the student's first graduate quarter. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

**Doctor of Philosophy in Linguistics**

The following requirements are in addition to the basic University requirements for the degree sought; see the "Graduate Degrees (http://exploredegrees.stanford.edu/graduatedegrees)" section of this bulletin. Students should review the department's Handbook for the Degree of Ph.D. in Linguistics (https://linguistics.stanford.edu/department-resources) for further particulars concerning these requirements.
1. Courses—a minimum of 135 units of graduate work beyond the bachelor’s degree, or 90 units beyond the master’s degree. The core course requirements detailed in the Department of Linguistics Ph.D. Handbook guarantee that each student covers a sufficient set of subareas within the field. Students must maintain a satisfactory record in the number and distribution of units completed. The overall course work GPA must be at least 3.0 (B), and all core courses should be completed with at least a ‘B’.

2. Language—each student must demonstrate an explicit in-depth knowledge of the structure of at least one language other than English, by writing a research paper on that language.

3. Research—each student is expected to complete two substantial qualifying papers. The deadline for completion of the first qualifying paper is the end of Autumn Quarter of the second year; the deadline for completion of the second qualifying paper is the end of Autumn Quarter of the third year. The subject matter of the two papers, although it may be related (for example, same language), must be clearly distinct. The requirement is fulfilled by one quarter of LINGUIST 395 Research Workshop (1-2 units), and by oral discussion of each paper with a committee of at least three faculty members selected by the faculty with input from the student.

4. Candidacy—each student must apply for candidacy for the Ph.D. by the end of the sixth academic year quarter, normally the Spring Quarter of the second year. Departmental prerequisites for candidacy include: (i) completion of a prescribed portion of the core course requirement (see item 1 above), (ii) completion of one qualifying paper (see item 3 above), and (iii) having an approved plan for completing the language requirement (see item 2 above). Late in Spring Quarter, the department faculty reviews each applicant and votes on whether to admit that student to candidacy. A student is only admitted to candidacy if, in addition to the student’s fulfilling the department prerequisites, the faculty makes the judgment that the student has the ability to complete the remaining stages of the Ph.D. program at a level of superior quality. Students who are not admitted to candidacy are terminated from the program; at the department’s discretion, they may be allowed to complete any requirements that remain for the master’s degree and receive this degree.

5. Teaching—at least three quarters serving as a teaching assistant in Linguistics courses.

6. Dissertation—
   a. appointment of a dissertation committee.
   b. an approved written dissertation proposal is required by the end of Autumn Quarter of the fourth year.
   c. oral discussion of the dissertation proposal with an augmented dissertation committee by the end of Spring Quarter of the fourth year.
   d. passing a University oral examination on the dissertation and related areas which includes a public presentation of the dissertation research.
   e. dissertation (up to 15 units of LINGUIST 399 Dissertation Research).

Ph.D. Minor in Linguistics

1. Courses—the student must complete 30 units of course work in Linguistics. The University requires that at least 20 of these units be at the 200 level or above; the remaining 10 units must be at the 100 level or above. The coursework for the minor must include at least 20 units of core courses, which should all be completed with at least a ‘B’. The overall course work grade point average (GPA) must be at least 3.0 (B).

2. Research Project (optional)—the student may elect to present a paper which integrates the subject matter of linguistics into the student’s field of specialization.

3. The Linguistics minor adviser or designee serves on the student’s University oral examination committee and may request that up to one-third of the examination be devoted to the minor subject.

Graduate Advising Expectations

The Department of Linguistics is committed to providing academic advising in support of graduate student scholarly and professional development. When most effective, this advising relationship entails collaborative and sustained engagement by both the adviser and the advisee. As a best practice, advising expectations should be periodically discussed and reviewed to ensure mutual understanding. Both the adviser and the advisee are expected to maintain professionalism and integrity.

Faculty

Emeriti: (Professors) Joan Bresnan, Eve V. Clark, Shirley Brice Heath, William R. Leben, Stanley Peters, John R. Rickford, Elizabeth C. Traugott, Thomas A. Wasow

Chair: Daniel Jurafsky

Professors: Cleo Condoravdi, Penelope Eckert, Daniel Jurafsky, Martin Kay, Paul Kiparsky, Beth Levin, Christopher Manning, Christopher Potts

Associate Professors: Arto Anttila, Vera Gribanova, Robert Podesva, Meghan Sumner

Assistant Professors: Judith Degen, Boris Harizanov (on leave AY 18-19), Daniel Lassiter

Courte sy Professors: Kenji Hakuta, Yoshiko Matsumoto, James McClelland, Chao Fen Sun

Courte sy Associate Professors: James A. Fox, Michael C. Frank, Noah Goodman, Miyako Inoue

Courte sy Assistant Professor: Jonathan Rosa

Lecturers: Philip L. Hubbard (Senior Lecturer, Language Center)

Adjunct Professors: Jared Bernstein, Ronald Kaplan, Lauri Karttunen, Paul Kay, Annie Zaenen, Arnold Zwicky

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