
LINGUISTICS

AT INDIANA
UNIVERSITY

From the Chair

Spring arrived about two weeks early this year, the Little 500 is over, and graduation is imminent. Among those completing their IU careers are 23 seniors who will graduate this spring or summer. Continuing a long history of excellence, six of them were nominated to the Phi Beta Kappa Society. One graduate—Katie Blake (right)—was a recipient of the Vice Provost's Award for Undergraduate Research, mentored by Assistant Professor Kelly Berkson.

The Computational Program saw two students receive their M.S. in December, with another receiving her degree in May. Three students will receive their M.A. degrees in general linguistics. Two students—Sara Sowers-Wills (see below) and Basem Al-Raba'a—are scheduled to defend their dissertations in May.

Four of our graduate students will be attending the LSA Summer Institute, which is being held at the University of Kentucky this year. Scholarships—generated from the Linguistic Student Support Fund—were awarded to three students and will cover half the cost of tuition for each one. The institute is an excellent opportunity for students to enhance their linguistic program and meet prominent scholars in the field, and we are pleased to be able to support them.

Students continue to be very active in their research, and in this issue, we highlight some of that work. In the past year, we have awarded Householder research support funding to two students—Young Hwang and David Tezil—totaling \$1,000. And four students—Hai Hu, Yiwen Zhang, Taiwo Ehineni, and Valentyna Filimonova—received support from the Student Travel Fund (\$1,200 total) to present their work at various conferences.

As we close out this academic year, let me reiterate that we greatly appreciate the financial support of our alumni, whose contributions play a key role in our program and the success of our students, both at the undergraduate and graduate levels. Thanks to all of you who make it happen!

Robert Botne



Senior Honors Thesis: Katie Blake
Rhoticity in Cajun French

Fall 2016 Graduate: Linguistics and French

My senior thesis project, directed by Dr. Kelly Berkson, focused on rhotics in Cajun French. The idea for this project came from working with Dr. Berkson, in the Phonetics and Phonology Lab, and Dr. Kevin Rottet, who has himself worked on Cajun French. Cajun French is spoken in Louisiana, in a region in the sound of the state commonly referred to as the 'French Triangle.' Research on this language is important because it has both minority and endangered status. Cajun French is seen in the community as a degenerate variation of Standard French, and this, coupled with the heavy influence of English in the area, has contributed to the extreme decline in its speakers. The language is no longer being passed on to new generations and will most likely cease to be spoken in the near future. Contributing to the body of work on such a language is important to me, and being both a French and Linguistics major, this thesis was the perfect way for me to combine both of my academic interests in a single research project.

I was interested in studying rhotics [r sounds] because, although they are quite common cross-linguistically, they have long been a contested subject within phonetics and phonology due to variability in their acoustic and articulatory properties. For instance, the Standard French rhotic is characterized as a velar fricative, while the rhotic in Cajun French is most often described as an alveolar tap. Though these two sounds are quite different, they are both shown to have effects on vowel quality and length, and are easy targets for deletion. When I looked at the phonetic vowel effects of rhotics and rhotic deletion patterns in several other varieties of French spoken outside of France, as well as previous literature on the variety spoken in Louisiana, I found a variety of vowel effects, but rhotic deletion was common among all five (French spoken in Côte d'Ivoire, La Réunion, Louisiana and two dialects in Canada, Acadian and Laurentian). Some varieties showed lengthening of the preceding vowel in a syllable with a rhotic coda, while others showed no effect on length. Centralization or lowering was described as an effect of vowel quality due to a rhotic in this position, with previous literature on Cajun French pointing out a lowering effect. Phonetic descriptions of rhoticity in these varieties often cited a drop in the third formant (F3) as emblematic of rhoticity. Given these previous trends, I expected the behavior in Cajun French to be: variable rhotic deletion, compensatory lengthening of the preceding vowel, a general lowering effect of the vowel space in a rhotic environment, and a lowered F3.

The data I analyzed were provided by recordings that Dr. Rottet made in order to build a corpus of Cajun French. He conducted interviews with speakers from the Terrebonne and Lafourche Parishes in southeastern Louisiana in 1993, and the tokens for this study were taken from these collections of natural, running speech. What I ended up finding in the data was not quite what I expected: though speakers were widely variable in deleting their rhotics, no effect of compensatory lengthening was shown, and vowels seemed to undergo a centralization, rather than a lowering, effect. Especially interesting were the analyses of F3 in each speaker for a chosen vowel, /ɛ/. Each environment was analyzed: a pronounced rhotic in coda position, a deleted rhotic in the same position, and no underlying rhotic. For one speaker, all these contexts patterned the same. For another, the *surface* contexts patterned the same (i.e., deleted rhotic and no rhotic showed a similar F3 value, while a pronounced rhotic triggered a lowered F3). The third speaker produced vowels that patterned together based on *underlying* context; even when a rhotic is deleted, it still leaves a phonetic trace on the preceding vowel by way of a lowered F3.

Future directions of this project include a phonetic analysis of the rhotic in the coda, which may shed light on

why it behaves in the ways outlined above. An expansion of the rhotic environments would also contribute to a better picture of their behavior and effects: only rhotics in coda position were analyzed in this study. Finally, controlling for speaking rate may also affect the analysis of compensatory lengthening.

Senior Honors Thesis: Abby Elston

Three-dimensional imaging of tongue shape
in Marathi liquids

2017 Graduate: Linguistics and French

Being a student of linguistics, speech and hearing sciences, and French, I have wanted to learn more about the variability, acquisition, and articulatory complexity of liquids and render them a little bit less mysterious. My honors thesis investigates the tongue shape of the five liquids in Marathi—an Indic language spoken in Maharashtra—via 3D ultrasound images.

Marathi contains an alveo-palatal rhotic /r/, its breathy counterpart /r^h/, a dental lateral /l/, its breathy counterpart /l^h/, and a retroflex lateral /ɭ/. However, there is some debate in the literature concerning the actual point of constriction of airflow. Additionally, more knowledge as to what distinguishes a plain sound from its breathy version at the level of tongue movement is needed.



I wanted to investigate this for my honors thesis project, so data from a native female speaker was collected. Five words were embedded in a carrier sentence to elicit the liquid phonemes. Data was collected in Dr. Lulich's ultrasound lab in the Department of Speech and Hearing Sciences. A headset was worn to stabilize the transducer, and an impression of the palate was made using dental alginate, which

was then digitized through a 3D laser scanner.

Ultrasound images of the tongue were then generated as frames of the tongue moving through the utterances in real-time. These images were saved in a DICOM format and were then analyzed with a custom MATLAB toolbox, WASL. This allowed us to view sagittal (anterior/posterior), coronal (left/right), and horizontal (inferior/superior) angles of the tongue. These 2D images together created an XYZ plane on which tracings of the tongue could be made. For example, if a sagittal frame of the tongue was traced, it would correlate to a point in space

coronally and horizontally as well. Once these points were interpolated, a 3D image of the tongue for a particular point in time is thus created. The palate is aligned with the tongue to gather information about the point of constriction. This was done for frames going into and out of each liquid of interest (i.e., a frame of the vowel immediately preceding and immediately following the liquid) and the frames capturing the liquid itself.

Though the data are still being analyzed at this time, at this point it seems that our classifications of the phonemes seem to be accurate and that there may be a physiological difference in the production of breathy versus plain liquids.

Senior Honors Thesis: Kristina Mihajlovic

The perception and production of Croatian/Bosnian/Serbian sibilants by heritage speaker in the U.S.

2017 Graduate: Linguistics

Croatian/Bosnian/Serbian (“CBS”) is one of my heritage languages, and I’ve always been surrounded by heritage speakers, so I became interested in studying them. Apart from these speakers, language change and variation is also one of the most interesting subfields of linguistics, so I wanted to investigate a current merger taking place to educate myself on the questions and conversations surrounding heritage speakers, sound change, and perception and production. My honors thesis investigates the perception and production of a pair of merging sounds in CBS, a South Slavic language continuum primarily spoken in Croatia, Bosnia, Serbia, and Montenegro, with large diaspora populations in the United States, Canada, and Australia.

Heritage speakers are broadly defined as those speakers who speak a language other than the dominant language of the country they live in. CBS has the voiceless pre-palatal affricate /ć/ [tɕ] as well as the voiced post-alveolar affricate /č/ [tʃ], which are merging in some dialects of homeland CBS, primarily in regions of Croatia and Bosnia. Additionally, the voiced pre-palatal /đ/ [dʒ] and post-alveolar /dž/ [dʒ] also exist and may also be merging, but the voiced post-alveolar is primarily found in Turkish loan words, so this comparison is more difficult to make confidently. The



merger is taking place partially because the sounds carry a low functional load, but also because /ć/ and /č/ are produced similarly in terms of phonotactics.

For my perception experiment, I recorded a native speaker who could create the distinction and had 20 speakers (F = 16) perform a forced-discrimination task listening to these stimuli. Syllables containing /ć/, /č/, /đ/, and /dž/, as well as two non-merging sounds, post-alveolar /š/ [ʃ] as well as alveolar /c/ [ts], as control sounds. The production experiment included asking speakers to read aloud a text that was adapted from Wikipedia to contain several tokens of each of the six sounds. A spectral measures script was run on the extracted sound files to gather information on center of gravity, one of the main values used to categorize sibilants.

Though the relationship between the production and perception data is still being analyzed at this time, some interesting results have come from the perception data. While first generation speakers performed much better than second-generation speakers on the forced discrimination task, as expected, I also discovered that first-generation speakers did not perform better when asked to discriminate between the merging pre-palatal /ć/ and merging post-alveolar /č/, which supports that these sounds are merging, at least in perception. I am very excited to share my final results with my speakers, some of whom are as interested in this merger as I am.

Senior Honors Thesis: Alyssa Strickler

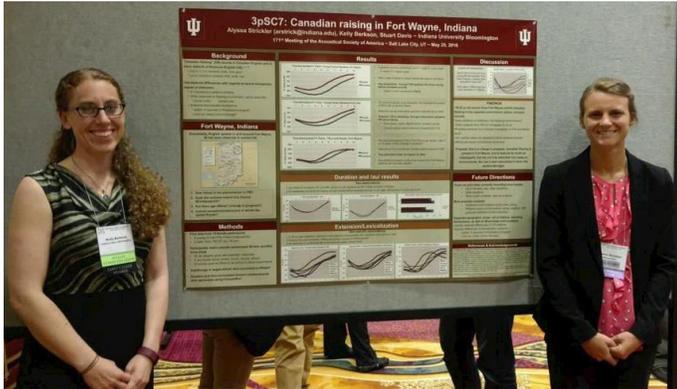
Canadian raising in Fort Wayne, Indiana

2017 Graduate: Linguistics

I joined Professor Kelly Berkson’s Phonetics and Phonology Lab in Fall 2015, and became interested in a project about a possible vowel change in the speech of Fort Wayne, Indiana, because my hometown is near Fort Wayne. The vowel change is /aɪ/ raising (sometimes called Canadian Raising) which occurs when [aɪ] raises to [ʌɪ] before a voiceless consonant but not before a voiced consonant. I joined the project, and Professor Berkson and I, in collaboration with Professor Stuart Davis, presented initial data at the Acoustical Society of America meeting in May 2016, which described the speech of a small group of women from Fort Wayne, in which a group of college-aged speakers showed /aɪ/ raising but a group of older speakers did not. Following this, we collected and analyzed more data, and were able to identify different patterns of raising in two speakers, of which one seemed to be a more advanced version of the other.

My thesis is a description of four patterns of /aɪ/ raising that emerge in the data of speakers aged 19-78 from Fort Wayne. Data were collected using a word list,

recorded in quiet areas. The four patterns are: (0) speakers with no raising at all, (1) speakers who only raise /aɪ/ in unstressed vowels with very short duration (*citation, titanic*), (2) speakers with raising in monosyllabic words (*write* and *cite*, but in which pre-flap /aɪ/ patterns together in words like *writing* and *riding*), and (3) speakers for whom the pre-flap environment in *writing* and *riding* has phonologized, and the vowel in *writing* is raised to [ʌɪ],



Alyssa Strickler (right) and Assistant Professor Kelly Berkson (left) displaying their poster at the Acoustical Society of America meeting

although the phonetic environment is the same. The patterns appear to follow a number-order progression, with 0 being the least advanced form of raising (none) and 3 being the most advanced form (phonological) occurring in these data; the two phonetically-motivated raising environments (patterns 1 and 2) serve as intermediary steps. The overall goal of this study is to describe the introduction of /aɪ/ raising as it is occurring in Fort Wayne, Indiana, noting that it is characterized by a great deal of interspeaker variation. Some broad observations that can be made at this time are that generally speaking, the data from male speakers follows an inverse trend with regards to age and pattern number: that is, younger males have a more advanced pattern of raising (2-3) while older males have a less advanced pattern of raising (0-1). Female speakers, however, show much more variation across age groups.

Dissertation Profile: Dua'a Abu Elhija

A study of borrowing and code-switching in spoken and online written Arabic by Palestinian Israelis

Advanced Ph.D. student: General Linguistics

Hebrew and Arabic have been in contact for more than a century as Hebrew has become the dominant language in the Israel/Palestine region. These typologically similar

languages have been affecting each other as both languages borrow from each other. The vast majority of the new generation of the Arabic speakers in Israel are bilingual, and speakers code switch to Hebrew as well as borrow some words that either refer to new cultural or technological concepts, as well as new references for preexisting notions. My research investigates several aspects of the phenomena of Code switching (CS) and word borrowings as presented in speech, as well as in Computer Mediated Communication (CMC): First, the frequency of Hebrew loanwords in spoken vs. written CMC corpora; second, the topics and domains which are most and least affected by Hebrew loanwords; third, whether the typed and spoken representation of the borrowed words reflect adjustments to Arabic phonology and if so, to what extent the two different modalities of communication (spoken and written) affect phonological adaptation and how these two modalities affect the density of borrowing as well as code switching; and last, whether the syntactic characteristics of these code-switches bi-directionally affect the L1 and L2 phonology of speakers of both languages. Data is being collected using a three-part questionnaire. The first part investigates language attitudes towards Classical Arabic, Palestinian Colloquial Arabic, and Hebrew. The second part examines the subjects' self-reported use of CS between Palestinian Colloquial Arabic and Hebrew and their opinion regarding this phenomenon and code switchers. The final part asks about the social use of CS in relation to the age and intimacy variables. I have been in Israel since June 2015 to collect data, expecting to finish by August 2018. I aim to contribute to the literature about Hebrew and Arabic language contact in a new way by adding CMC data which has not been as thoroughly researched.



(Dua'a is a recipient of a College of Arts and Sciences Dissertation Year Research Fellowship 2016-17)

Dissertation Profile: Vitor Leongue

Structural evolution of the Tibetan syllable:
A cross-dialectal study

Advanced Ph.D. student: General Linguistics

Despite being a fundamental part of Tibeto-Burman, one of the major language families in the world, Tibetan has not received much attention in the field of linguistics. There is a wealth of interesting linguistic phenomena in Tibetan that are largely unexplored. My dissertation investigates how the structure of the Tibetan syllable has evolved across a wide range of dialects belonging to seven major groups: Western Archaic, Western Innovative, Central, Southern, Northern Khams, Eastern Khams, and Eastern Amdo. These dialects spread over China, India, Nepal, Bhutan, and Pakistan.

To clarify, what is commonly referred to as “Tibetan” is in fact a group of related but distinct languages with varying degrees of mutual intelligibility. The multitude of modern Tibetan varieties are all descendants of Old Tibetan, which was spoken in the Tibetan Empire between the 7th and 9th centuries. The syllable structure of Old Tibetan was remarkably complex; it allowed up to four consonants in the onset and up to two in the coda. This complexity, while still preserved in the written language and some archaic dialects, has been greatly reduced in most contemporary varieties (the maximal syllable of many innovative dialects is just CV(C), for example).



In my research, I seek to analyze the various historical changes the Tibetan syllable has undergone from a number of perspectives. The purpose of my dissertation is threefold. First, I will provide a comprehensive cross-dialectal survey of how the

different syllabic constituents in Tibetan have changed over time compared to their earlier structures as reflected in the script. Most of the existing studies focused almost entirely on onset development; far less attention has been given to the rime and the syllable as a whole. Also, these studies focused only on a small handful of dialects from one or two major groups. My work examines the overall diachronic development of the Tibetan syllable in a more extensive selection of modern dialects (at the present stage of development, over thirty different dialects representing all the major groups given above are being investigated).

Second, I will explore the phonetic and phonological motivations for the observed historical changes. Much of the previous literature was descriptive in nature and offered little or no explanation for why such changes might have occurred. My work provides a systematic account that aims both to describe and explain the development of the different parts of the Tibetan syllable. Historical processes that are being examined include vowel fronting triggered by coronal codas, parallel avoidance of liquids in the coda and the non-initial slot in onset clusters, various cases of epenthesis and coalescence, among others. These changes are analyzed using both representational and constraint-based approaches in phonology. The potential phonetic bases for their occurrence are also taken into account.

Third, I will situate my findings in a broader typological context to evaluate previous claims about sound change and its apparent universality. Many changes that have taken place in the Tibetan syllable resemble both synchronic and diachronic processes attested in other languages. Examples of such processes will be considered to determine how cross-linguistic recurrence of certain sound patterns can inform theories of language universals and phonological typology. Questions concerning the role of diachronic change in shaping synchronic phonological grammar and whether sound change is more guided by low-level phonetic effects or higher-order phonological constraints will also be explored.

This dissertation involves the analysis of both primary and secondary data. Primary data are being collected through ongoing fieldwork with native speakers of less documented Tibetan dialects who reside in Bloomington, Indiana, and the vicinity. Secondary data are drawn from a variety of existing studies encompassing all of the aforementioned major groups of Tibetan languages. Given the current scarcity of research on Tibetan linguistics, I hope my project will bring more awareness to the Tibetan language group. Also, by examining diachronic and synchronic data from these understudied languages, I hope to discover new insights and contribute to a better understanding of the mechanisms of sound change.

*[*Vitor is a recipient of a College of Arts and Sciences Dissertation Year Research Fellowship 2017-18. His work has been supported in part by the University Graduate School Grant-in-Aid of Doctoral Research.]*

Dissertation Profile: Sara Sowers-Wills
Schema theory as support for templatic analysis
in a Dynamic Systems Theory approach
to early phonological development

Advanced Ph.D. student, General Linguistics

Child language data is notoriously unwieldy. Children may produce several phonetic variants for a given word or use the same forms for several different words. Often there is little segmental correspondence between child and adult target forms. In many cases, data collected early in phonological development seems to bear little systematicity at all. Competing theories have arisen to account for this range of phenomena, but each struggles with some component of the task on the whole. My dissertation crafts a usage-based theory of phonological acquisition, uniting a whole-word approach to representation, schema theory as characterized by cognitive grammar, and dynamic systems theory.

There is growing evidence for the primacy of phonological representation shaped by the whole word (i.e., template), rather than by segments or features, in the early stages of acquisition. Templates can take a variety of forms ranging from segmental sequences to positionally-defined patterns and are thought to result from a child's production behavior. That is, phonetic information in the production of babbling patterns and first words is abstracted away to form representational units in a phonological system. Despite evidence for whole-word templates, a lack of clarity regarding how they evolve and potentially interact warrants closer investigation of their structure and function. Herein lies the utility of schema theory.

Schema theory calls for the representation of schematic categories in a hierarchical organization defined by variable and varying degrees of abstraction. Viewing child forms as the result of the instantiation of schematically defined patterns helps to make sense of a host of variant child forms that share a basic phonetic shape. Placing production data within schematic networks, furthermore, reveals relationships between developing phonological categories and allows us to map degrees of abstraction as phonetic information enters a more abstract system. Importantly, the schematic depiction of this



information is only a still shot of a system continuously evolving in real time. Dynamic systems theory allows us to incorporate temporal information into our conceptualization of a system. In this view, representation is conceived as continuous processes rather than static symbols. Serving as an overarching framework, dynamic systems theory offers a set of properties that can describe the tenuous and variable stability of production routines in an incipient phonological system.

At its core, my dissertation is a study of representation. Targeting a narrowly defined period at the onset of word production, I examined production data collected from four children acquiring American English to investigate representation at the onset of word production. Data from this period are difficult to obtain because babies have unpredictable speech habits and are not easily coaxed to perform. For this reason, diary studies—particularly those conducted by parent-researchers—have great utility. Three of the phonological data sets used in this work come from data sets obtained from the CHILDES database, and the fourth I collected myself from my older daughter, who is now three years old. Data from my daughter form the centerpiece of the dissertation and the other data are used to highlight points of contrast in developmental paths across children.

This research involves two major analytical steps. The first is templatic analysis. I am conducting a thorough analysis of each child's lexical development in connection with templatic behavior. For example, during my daughter's first month of word production, most of her forms were shaped by a non-consecutive labial-velar consonant sequence. This resulted in forms that sometimes relatively accurately match adult targets (e.g., *peek* [pɪk]), and sometimes did not (e.g., *bubble* [bʌku]). The other children whose data I studied relied on other patterns, including a set of velar-based patterns, h-initial and sibilant-final shapes, and consonant harmony. The analysis reveals points at which the prominent use of a particular template—or set of templates—was seen and how this may be associated with changes in linguistic knowledge. The second analytical step places templatic patterns within schematic networks. Doing so enables a visual depiction of emerging representation as a phonological system gains in complexity.

The union of the templatic approach with schema theory and dynamic systems theory offers a novel approach to early acquisition data, which can and should be extended to later periods of development. This research highlights idiosyncrasy in developmental paths across children and the importance of conditions present at the inception of a phonological system for seeing how each path takes shape. Prospective projects extending this research include a study of developing phonological

neighborhood density, an examination of factors contributing to homonymous forms in early production, and more targeted investigations of specific segments or segmental patterns in development.

[Sara is a recipient of a College of Arts and Sciences Dissertation Completion Fellowship 2016-17. She will defend her dissertation in Mid-May.]

Dissertation Profile: Phillip Weirich **Explorations of dialect perception in Indiana**

Advanced Ph.D. student, General Linguistics

My dissertation will explore some of the linguistic and social influences that affect the perception of regional speech patterns, including the interaction between people's own phonological systems, their own cultural and linguistic orientation, and their ability to classify dialectal variation in Indiana.

Indiana is a state with a surprising amount of regional dialect diversity. Four broad regional dialects, the North, Inland North, Midlands, and Southern dialects, can all be found within the state. Beliefs about and attitudes toward linguistic variation play an interesting role in the perception of these dialectal variants, however. In particular, attitudes toward the speech of people in northern Indiana tend to be neutral, even though a difference is acknowledged, and the speech is not stigmatized. Attitudes toward the speech of southern Indiana, however, are largely negative, thus, the speech of people in that region is stigmatized. An extra layer of complexity involves beliefs about a standard, or "normal" dialect of American English. While the Midlands dialect is widely considered the standard dialect, people in the Northern part of the state, whose dialect varies systematically from speech in the central part of the state, believe their speech to be standard "newscaster" English.

Research over the last half century has indicated that individual speakers' orientation toward local culture and sociolinguistic patterns plays an important role in speakers' linguistic production. Furthermore, speakers' linguistic experiences influences the kinds of linguistic structures they acquire, which then bias their sensitivity to certain patterns of dialectal variation. For example, someone who has merged two phonological categories (such as the merger of the vowels in CAUGHT and COT), may not notice that someone distinguishes the two vowels, but the person who distinguishes the vowels would notice when a speaker merges the two vowels.

For my dissertation research, I will study language users in several dialect regions within Indiana. I will develop a method to classify speakers' phonological

systems based on the kinds of phonological contrasts they make as well as the identity of the phonetic realizations of those contrastive segments. I will then conduct a series of perception experiments to see how Hoosiers (people from Indiana) categorize the speech of other Hoosiers from their own and other dialect regions.

I expect that participants will demonstrate reduced sensitivity to speech from their home dialect region. People who do not distinguish phonological contrasts that are present in another dialect will not be able to use such information to classify the dialect. Those in stigmatized dialect regions who have positive orientations toward their home region will be less sensitive to local dialect patterns,



while people with negative orientations will not only be less likely to participate in regional dialect-specific patterns and be more sensitive to such dialectal variation, although still less sensitive to the regional dialect-specific patterns than people from other dialect regions.

A deeper understanding of the relationship between linguistic structure, sociolinguistic orientation/identity, and the perception of dialect variation in a relatively narrow (and culturally unified) geographic area will shed light on some mechanisms of diachronic language change as well as contribute to our knowledge of factors that contribute to the social evaluation of synchronic language variation.

IU Linguistics polo shirts. Deep crimson color.

Spring is here and summer is just around the corner. For each \$100 in donations to any of our departmental funds, donors may receive an IU Department of Linguistics polo shirt, perfect for those warm summer days. In order to receive this gift, donors must fill out a pledge sheet (available at <http://www.indiana.edu/~lingdept/donations/>) and return it to the IU Foundation. (Online orders cannot receive a shirt, but are still welcome.)



Department polo shirt modeled by Markus Dickinson. *Photo: Stephanie Dickinson*