

Department of Physics and Astronomy

Spring 2022 | Morgantown, WV

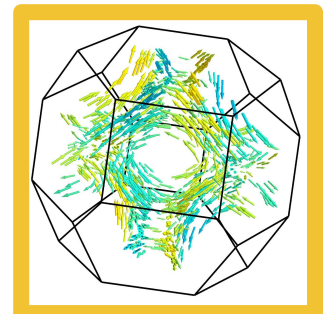
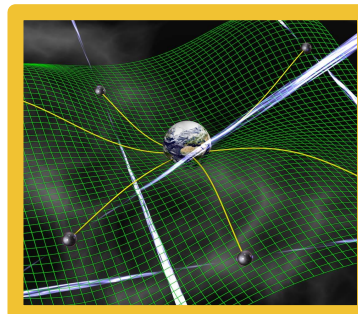
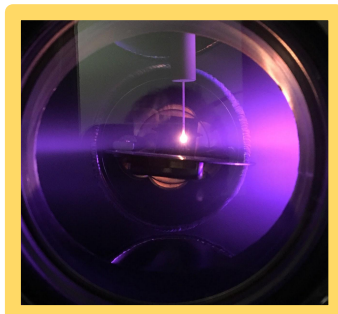
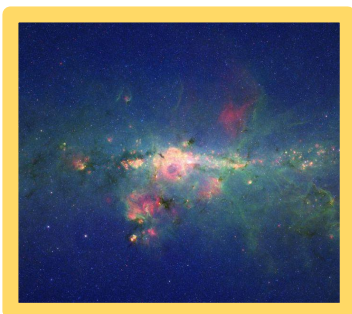
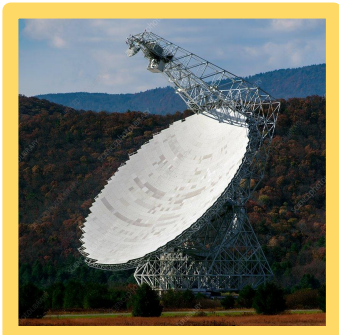
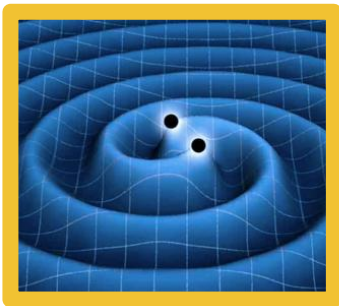


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Facebook:

West Virginia University, WVU PAGSO (Physics and Astro), WVU
Department of Physics and Astronomy

Twitter:

@WestVirginiaU, @WVUEberly, @PhysicsandAstro, @WVUScience,
@WVUGPSS

Notes

Welcome to WVU

We would like to welcome you to our university in the mountains and are proud to have WVU on your short list of graduate schools! We hope that your visit here is productive and that you get the chance to enjoy Morgantown and its beautiful surroundings. In addition to your individual schedule, you'll find listings for restaurants, pubs, events, and local attractions within this guide. Once you've had your fill of science, perhaps you would also enjoy a tour of the Department of Physics and Astronomy in historic White Hall, built in the 1940s and recently renovated. Whatever you get into during your downtime here at WVU, we wish you a pleasant stay.

A closer look at Mountaineer Physics and Astronomy...

- We offer undergraduate (BS, BA) and advanced degrees (MS, PhD) in Physics.
- Our main research areas are condensed matter, plasma physics, radio astronomy, & physics education.
- There are 22 full time faculty members and nearly 70 graduate students.
- Researchers here enjoy access to in-house machine and electronics shops, high performance computational facilities, on-the-roof optical and radio telescopes, the Engineering Fabrication Facility, and much more...
- Near the US Department of Energy's National Energy Technology Laboratory (NETL), our students and faculty participate in inter-institutional collaborations, conducting both basic and applied energy research at state of the art facilities.
- Our proximity to the Green Bank Observatory (2.5 hours South) gives us easy access to world-class instruments and expertise.



PLAN OF STUDY FOR THE PHD DEGREE

Year 1:	4 courses	Mastering fundamental physics at the graduate level
	self-study	Preparing for the three written Graduate Exams
	Phys 797	Surveying choices for research advisor
Year 2:	courses	Completing core courses
	courses	Surveying subfields of specialization
	self-study	Completion of the written Graduate Exams
	Phys 797	Intellectual contributions in research
Year 3:	courses	Surveying subfields of specialization
	courses	Advanced analysis in subfield of specialization
	self-study	Completion of the oral Graduate exam
	Phys 797	Intellectual contributions in research
Year 4:	Phys 797	Intellectual contributions in research
Year 5:	Phys 797	Intellectual contributions in research
		Writing and defending the dissertation

Typical Fall Courses

PHYS 611	Mathematical Methods
PHYS 651	Quantum Mechanics 1
PHYS 634	Electromagnetism 2
PHYS 710	Nonlinear Dynamics
PHYS 761	Statistical Mechanics
PHYS 771	Intro to Solid State Physics
PHYS 774	Optical Properties of Solids
PHYS 782	Computer Simulation of Plasma
PHYS 784	Magnetohydrodynamics
PHYS 791	Advanced Topics
ASTR 701	Computational Astrophysics
ASTR 702	Stellar Structure and Evolution
ASTR 705	Interstellar Medium

Typical Spring Courses

PHYS 633	Electromagnetism 1
PHYS 631	Classical Mechanics
PHYS 652	Quantum Mechanics 2
PHYS 772	Semiconductor Physics
PHYS 773	Collective Phenomena in Solids
PHYS 781	Principles of Plasma Physics
PHYS 783	Kinetic Theory
PHYS 791	Advanced Topics
ASTR 700	Radio Astronomy
ASTR 703	Galactic Astronomy
ASTR 704	General Relativity
ASTR 791	Advanced Topics

Doctor of Philosophy requirements

Students who pass all three sections of the qualifying examination at the 60 percent level are admitted to candidacy for the Ph.D. degree. Research is the central focus of the degree and is directed by a faculty advisor. Early in the research program the student must make an oral presentation to the Dissertation Committee reviewing some of the published research in his or her subfield of specialization. When the student's research is completed, it is described in a written dissertation and defended before the Dissertation Committee. The average completion time for the Ph.D. is five years beyond the B.S.

The Ph.D. requires 37 hours of coursework at the 600 level or above. This includes eleven required courses and four hours of PHYS && (research credit). The eleven courses must include the five core courses 611, 631, 633, 651, and 761, one of either 634 or 652, and any two of the following: PHYS 710, 726, 763, 764, 773, 783, 784, 791, 793, ASTR 700, 701, 702, 704, 791, and 793.

The three remaining elective courses may be chosen from courses in the above list and those outside of Physics and Astronomy with the constraint that:

Courses must be approved by the Graduate Advising & Studies Committee. Courses previously approved remain on a pre-approved list. The current list of approved courses is:

- EDP 613. Statistical Methods 1
- EDP 614. Statistical Methods 2
- EDP 619. Survey Research Methods
- EDP 711. Multivariate Methods 1
- EDP 712. Multivariate Methods 2
- EE 528. Biomedical Microdevices
- EE 564. Digital Signal Processing for Radio Astronomy
- EE 650. Optoelectronics
- CS 691A. Machine-Learning

Courses may be added to this list provided a good reason, a copy of the syllabus, and a copy of the book are provided.

TYPICAL COURSE PLAN FOR GRADUATE STUDY

Fall Year 1

PHYS 611	Introduction to Mathematical Physics
PHYS 651	Quantum Mechanics 1
PHYS/ASTR	Elective (optional)

Spring Year 1

PHYS 633	Electromagnetism 1
PHYS 631	Classical Mechanics
PHYS/ASTR	Elective (optional)

Fall Year 2

PHYS 761	Statistical Mechanics
PHYS/ASTR	Elective
PHYS/ASTR	Elective (optional)

Spring Year 2

PHYS/ASTR	Elective
PHYS/ASTR	Elective
PHYS/ASTR	Elective (optional)

Undergraduate courses: A student may choose to take undergraduate courses in their first year if they feel inadequately prepared for the graduate-level courses. These courses will not be counted towards the graduate degree, but they will maintain the student's good standing.

In summary

<u>The purpose of:</u>	<u>Is for:</u>
core graduate courses	<ul style="list-style-type: none"> • mastering fundamental physics at the graduate level • prerequisites for the topical graduate courses
topical graduate courses	<ul style="list-style-type: none"> • deciding on a research specialty (600 level) • background for the advanced graduate courses
advanced graduate courses	background for the PhD dissertation (700 level)
research (Phys 797)	making progress in one's specialty
teaching assistantship	instructional support of the department's teaching mission
research assistantship	personnel support of a specific professor's research program

Department of Physics and Astronomy
Telephone Directory – 2021-22

Faculty

Name	Office Ext.	Office	Lab Ext.	Lab
Abdul-Razzaq, Wathiq	3-5045	305	6-9929	302
Anderson, Loren	3-4884	G63	6-9917	G55
Bristow, Alan	3-5193	439	6-9948	438
Cassak, Paul	3-5102	333	n/a	n/a
Cen, Cheng	3-4730	441	n/a	B21
Flagg, Ned	3-7411	431	6-9911	B22
Fonseca, Emmanuel	3-0857	G60	n/a	n/a
Fowler, Chris	3-4713	339	n/a	n/a
Golubovic, Leo	3-5195	435	n/a	n/a
Goodrich, Katy	3-5019	241	6-9926	234
Holcomb, Micky	3-5196	437	6-9947	434
Johnson, Matt	3-5136	403	6-9954	424, 430
Koepke, Mark	3-4912	203	6-9924	230, 238
Lee, Joonhee	3-4920	205	n/a	324
Li, Lian	3-4270	233	n/a	210/214
Lorimer, Duncan	3-4867	G61	n/a	n/a
McLaughlin, Maura	3-4812	G59	n/a	n/a
McWilliams, Sean	3-3076	G58	n/a	n/a
Miller, Paul	3-4939	209	n/a	n/a
Murphy, Sheena	3-5017	239	n/a	n/a
Pisano, D.J.	3-4886	111D/ G65	6-9917	G55
Romero, Aldo	3-6317	207	n/a	n/a
Scime, Earl	3-5125	341	6-9940 6-9941	318, 334 338
Seehra, Mohindar	3-5098	307	n/a	n/a
Spolaor, Sarah Burke	3-2771	G68	n/a	n/a
Stanescu, Tudor	3-5194	433	n/a	n/a
Stewart, Gay	3-5032	303	n/a	n/a
Stewart, John	3-5107	235	n/a	n/a
Tu, Weichao	3-3349	337	n/a	n/a
Weldon, Art	3-5106	335	n/a	n/a
Williamson, Kathryn	3-5099	309	n/a	n/a

Staff

Name	Office Ext.	Office
Bryant, Viola	3-4888	111C
Glaser, Joe	3-6895	311
Hart, Harley	6-9943	409
Heitz, Miranda	3-4887	111
Legleiter, Holly	3-3422	G64
Mathess, Doug	3-4732	G19
Mattson, Margaret	3-3784	111G
Raber, JR	3-4732	G19
Snively, Vicki	3-4950	221
Lusk, Greg	3-0917	G12

Research Faculty and Postdocs

Name	Office Ext.	Office
Bhat, Soumya	3-3422	429
Pending	3-3422	M57
Eshetu, Wondwossen	3-3422	407
Pending	3-3422	M53
Lee, Sang Yun	3-3422	231
Michaluk, Lynn	3-3422	327
Oli, Basu	3-3422	231
Pirog, Michal	3-3422	G64
Pending	3-3422	411
Shi, Peiyun	3-3422	331
Srivastav, Prabhakar	3-3422	331
Steinberger, Tommy	3-3422	329
Tilley, Michael	6-9946	327
Wang, Qiang	3-0878	211
Xiang, Yinxiao	3-3422	411
Zhang, Huimin	3-3422	229
Pending	3-3422	327
Zou, Qiang	3-3422	229

Other

Name	Office Ext.	Office
GTA Office	6-9914	G03
Dept User Shop	6-9916	G20
Lactation Room	3-3422	223
Planetarium	3-4961	319
Undergraduate Lounge	6-9915	G07

Department of Physics and Astronomy

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111 White Hall
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West Virginia University
Morgantown, WV 26506-6315

Phone: (304) 293-3422

Fax: (304) 293-5732

Email: physics@wvu.edu

PHYSICS AND ASTRONOMY FACULTY

Eberly Professors

McLaughlin, Maura (maura.mclaughlin@mail.wvu.edu) Astrophysics

Stewart, Gay (gay.stewart@mail.wvu.edu) Physics education

Jefimenko Professor

Scime, Earl (escime@wvu.edu) Experimental plasma physics.

Professors

Abdul-Razzaq, Wathiq (wabdulra@wvu.edu) Experimental solid state; particulate matter in the environment.

Cassak, Paul (paul.cassak@mail.wvu.edu) Theoretical plasma physics

Golubovic, Leonardo (lgolubov@wvu.edu) Condensed matter theory and statistical physics.

Johnson, Matt (matthew.johnson@mail.wvu.edu) Condensed matter experiment

Koepke, Mark E. (mkoepke@wvu.edu) Experimental plasma physics; nonlinear dynamics.

Li, Lian (lian.li@mail.wvu.edu) Condensed matter experiment

Lorimer, Duncan R. (duncan.lorimer@mail.wvu.edu) Astrophysics

Pisano, D.J. (djpisano@mail.wvu.edu) Chair of the Department. Astrophysics

Associate Professors

Anderson Loren (loren.anderson@mail.wvu.edu) Astrophysics

Bristow, Alan (alan.bristow@mail.wvu.edu) Associate Chair. Condensed matter physics, optics.

Cen, Cheng (cheng.cen@mail.wvu.edu) Experimental condensed matter physics

Etienne, Zach (zach.etienne@mail.wvu.edu) Adjunct Assistant Professor, Numerical relativity

Holcomb, Micky Barry (micky.holcomb@mail.wvu.edu) Experimental condensed matter physics

Miller, Paul (paul.miller@mail.wvu.edu) Teaching Associate Professor. Physics education.

Romero, Aldo (aldo.romero@mail.wvu.edu) Computational condensed matter physics

Stanescu, Tudor (tudor.stanescu@mail.wvu.edu) Theoretical condensed matter physics

Stewart, John (john.stewart@mail.wvu.edu) Physics education

Assistant Professors

Burke-Spolaor, Sarah (sarah.spolaor@mail.wvu.edu) Astrophysics

Devore, Seth (stdevore@mail.wvu.edu). Visiting Assistant Professor. Physics education.

Flagg, Ned (edward.flagg@mail.wvu.edu) Experimental quantum optics

Fonseca, Emmanuel (emmanuel.fonseca@mail.wvu.edu) Astronomy

Goodrich, Katherine (katherine.goodrich@mail.wvu.edu) Space Physics

Lee, Joonhee (joonhee.lee@mail.wvu.edu) Biophysics/neuroengineering

McWilliams, Sean (sean.mcwilliams@mail.wvu.edu) Gravitational wave computation and theory

Tu, Weichao (weichao.tu@mail.wvu.edu) Space physics

Williamson, Kathryn (kathryn.williamson@mail.wvu.edu) Teaching Assistant Professor. Physics education.

Research Faculty

Demidov, Vladimir (vladimir.demidov@mail.wvu.edu) Experimental plasma physics.

Fang, Fang (fang.fang@mail.wvu.edu) Solar plasma physics.

Fowler, Chris Space Physics

Ma, Yanjun (yanjun.ma@mail.wvu.edu) Materials science

Schulze, Julian (felixjulian.schulze@mail.wvu.edu) Experimental and computational plasma physics

Wang, Qiang (qiang.wang@mail.wvu.edu) Condensed matter experiment

Adjunct Faculty

Papanikolaou, Stefanos (stafanos.papanikolaou@mail.wvu.edu) Mechanical/Aerospace engineering

Emeritus Professors

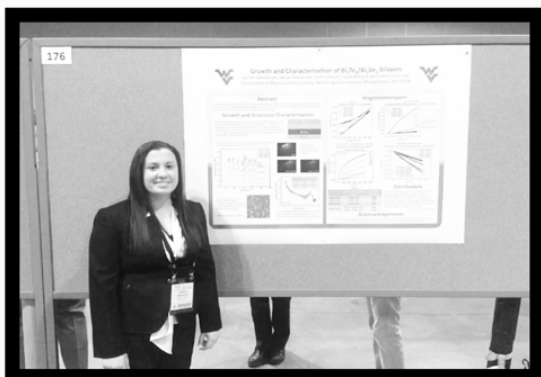
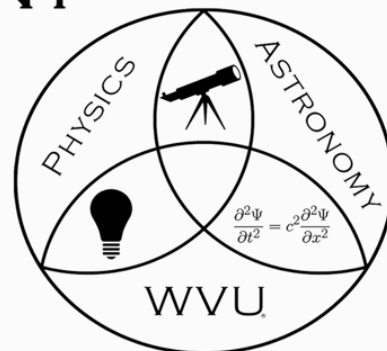
Halliburton, Larry (lhallibu@wvu.edu) Condensed matter experiment

Seehra, Mohindar (mseehra@mail.wvu.edu) Eberly Distinguished Professor Emeritus, Condensed matter experiment

Treat, Richard (rtreat@mail.wvu.edu) Theoretical physics

Weldon, Art (hweldon@mail.wvu.edu) Particle physics theory

PHYSICS AND ASTRONOMY GRADUATE STUDENT ORGANIZATION



STUDENT
IMPROVEMENT
& SUPPORT



COMMUNITY
OUTREACH



FUNDRAISING



SOCIAL EVENTS

PAGSO?

What do we do?

Provide student representation to faculty meetings and University committees. Assist in planning workshops and department speakers throughout the year. Coordinate community service at the local children's museum and elsewhere. Plan social events for graduate students (dominating at trivia, Relay for Life team, post-qualifier celebrations, etc). Tackle graduate student issues as they arise.

Why should you care?

We formed in the Fall of 2013 to open clearer lines of communication between the graduate students and the faculty and staff of the department. Your voice and concerns help *enormously* in fostering this communication. Since the formation of PAGSO, graduate students from the Department of Physics and Astronomy have taken on many roles across campus and are truly leaders amongst graduate students here at WVU.

2021-2022 Officers and Chairs

President - Will Fiore - wcf0002@mix.wvu.edu

Vice President - Alexandra Abova-Volkova - aa00037@mix.wvu.edu

Treasurer - Terrence Pierre Jacques - tp0052@mix.wvu.edu

Secretary - Graham Daskoch - gd00010@mix.wvu.edu

Faculty Liaison - Nick Luber - nml0011@mix.wvu.edu

DEI Liaison - Evan Smith - ets0005@mix.wvu.edu

Outreach - Evan Lewis - efl0003@mix.wvu.edu

Social - Graham Daskoch - gd00010@mix.wvu.edu

- Alexandra Abova-Volkova - aa00037@mix.wvu.edu

Recruitment - Evan Smith - ets0005@mix.wvu.edu

Mentorship - Mitchell Paul - mp0023@mix.wvu.edu

2022 Off-Campus Housing Information

<https://campuslife.wvu.edu>

Points of Interest

The Metropolitan Theatre – Located on High Street, this local theatre offers community shows and, for the more active in the evening, provides a pool hall underneath the theatre for some time relaxing.

Cooper's Rock State Forest and Overlook – A short drive (15 min.) outside of Morgantown is Cooper's Rock, which provides hiking trails, picnic grounds, and a majestic overlook of the land of the Mountaineers. This offers a different, more rugged view of Morgantown while providing a pleasant selection of West Virginia wilderness and scenery – it is particularly beautiful in Autumn when the leaves are just starting to change. The WVU Research Forest sits adjacent to Cooper's Rock. This 7,600 acre plot of land was leased for 100 years from the state of West Virginia for just \$1 per year!

Morgantown Farmer's Market – Though it won't be open during your visit, the Farmer's Market is a staple of many graduate students. Open from May through September on Saturdays (8:30 am – 12:30 pm, 415 Spruce Street) and Tuesdays (4-7 pm, 801 Fairmont Road), you'll find local farmers selling a variety of produce, honey, breads, cheeses, etc. Bring cash, although some vendors accept credit/debit cards.

Fallingwater by Frank Lloyd Wright – A one hour drive northeast of Morgantown and just a jaunt off of I-68, Fallingwater offers guided building and garden tours, an artsy gift shop, and picturesque views of Pennsylvania's Laurel Highlands.

For more information and events, see <https://www.visitmountaineercountry.com/>



Regional Culture : Pittsburgh

After the decline of the steel industry, Pittsburgh rebranded itself as a hub for healthcare, robotics, and art, among others. It's a young, vibrant city and is less than an hour and a half drive from Morgantown. Some recommendations below...

Strip District - Smallman St. and Penn Ave. Every Saturday vendors lay out their wares on the sidewalks for all to see. Bring cash as numerous retail outlets in Pittsburgh do not accept. Paid parking averages \$5 in the strip for unlimited time. There are excellent sidewalk sales, including artisans selling jewelry, paintings, etc. along with great roasted coffee shops. "The Strip" is also home to some excellent ethnic food stores - Italian, Polish, Greek, Mediterranean, Japanese... Nearby you'll find the original Primanti Brothers (<https://www.primantibros.com/>) - a Pittsburgh tradition! We've found the best time to go is on Saturdays before 11:00 AM as there usually is no wait. Saturdays are also great because there is a sweet older woman selling homemade cream puffs and baklava for \$1.00. (#ProTip)

City of Champions Whether you're from a sports rival city or couldn't care less, Pittsburgh is a great place to go to a ball game. Tickets for Pirates games at PNC Park can go for as cheap as ~\$12 with a beautiful view of the city skyline. Also nearby is Heinz Field (home of the Steelers) and the Rivers Casino.

Best View of Pittsburgh West End-Elliot Overlook Park; Marlow St.; Pittsburgh, PA 15205

Some Others!

- Excellent Theatre District
- Great Science Museums, Zoo, and National Aviary
- One of a handful of open air aviaries in the United States!
- Duquesne Incline \$5.00 round-trip - Take the "funiculars" up Mount Washington.



PITTSBURGH

Downtown Restaurants

1. The Grind (C,D,G,V)
2. The Cupcakerie
3. Panera Bread (C,D,V)
4. Casa D'Amici (Pizza)
5. Fat Daddy's Bar & Grill (A)
6. Lotsa Mozza (G,V)
7. Tailpipes (Burgers)
8. D.P. Dough (Calzones)
9. Jimmy John's
10. Subway (D,V)
11. Vocelli Pizza
12. Yama Japanese Restaurant (D,G,V)
13. Pita Pit (V)
14. Chaang Thai (A, D, G, V)
15. Jameson's Bar & Grill (A,V)
16. Gibbie's Pub and Eatery (A,V)
17. Cold Stone Creamery
18. Salaam Mediterranean Cuisine
19. Sports Page (A)
20. Dirty Bird (Large Sandwiches)
21. Blue Moose Café (C, V)
22. Tin 202 (Craft Cocktails) (A,V)
23. Great Wall (Chinese)
24. Iron Horse tavern (A,V)
25. Black Bear Burritos (A,D,V)
26. Apothecary Ale House & Café (A)
27. McClafferty's Irish Pub
28. Morgantown Brewing Company
(A,V)
29. Fresh Mint (D,G,V)
30. Oliverio's Ristorante (A,V)
31. Mountain State Brewery (A,V)
32. Table 9 (G, A)
33. Quantum Bean (C)
34. Mad Fresh (D, G, V)

A – Alcoholic Beverages Served

C – Coffee Served

D – Dairy Free Options

G – Gluten Free Options

V – Vegetarian Options

Note: Though we endeavored to include everyone, the above list may be incomplete!

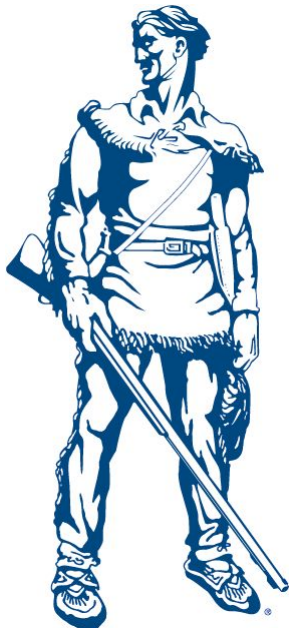
Other Nearby Restaurants

Chestnut Brew Works and Taproom - 444 Brockway Ave, Morgantown - One of three breweries in town, Chestnut was based out of a garage until 5 years ago. This taproom offers all of their beers and well-priced appetizers only steps away from many graduate students' houses.

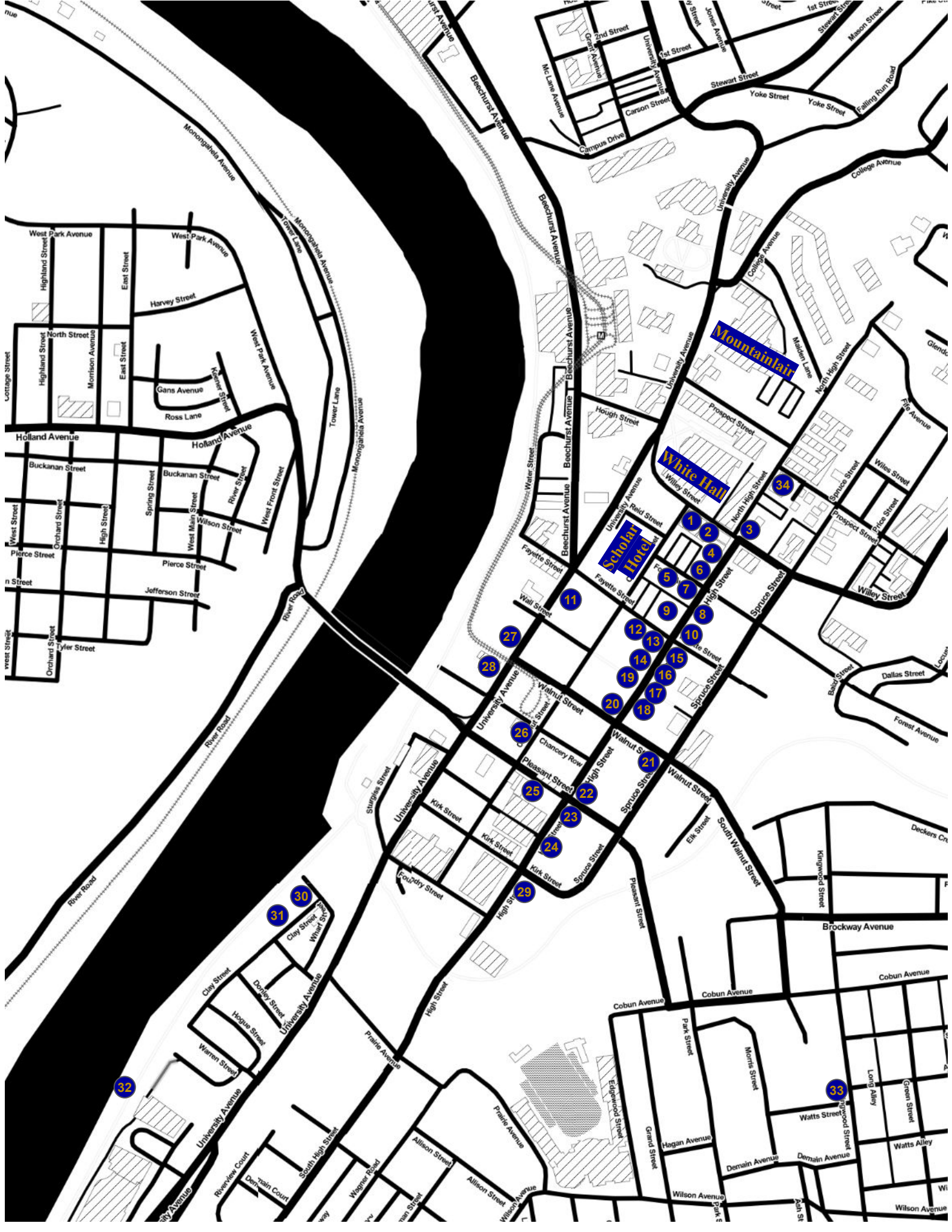
Saffron - 1894 Mileground Rd, Morgantown - A little farther away from downtown, this restaurant offers the best selection of Indian food in Morgantown as well as lunch buffet most days.

Puglioni's - 1137 Van Voorhis Rd, Morgantown - A local Italian restaurant that some claim to have the best pasta in Morgantown, this locally owned business is a small establishment that can fill up quickly on weekends.

University Town Centre - University Town Centre Dr, Morgantown - Located just off I-79, University Town Centre offers a selection of restaurants that will allow for ease in accommodating some larger groups. Restaurants in the centre include: Chili's, Red Lobster, Cheddar's, Cracker Barrel, and Olive Garden.



Mountaineer Pro-tip - If it says “No Parking”, you will likely be towed in seconds. It’s best to always be cautious when it comes to parking and feed the meters. There are several parking garages and paid lots around downtown (\$0.75 / hr). You have to prepay in the lots, which can be tedious. The Mountainlair (Student Union Building) parking garage is free on weekends after 8:30pm.



Mountainlair

White Hall

Scholar Hotel

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