Comparing pressures

November 18, 2021

[1]:
```
import pandas as pd
from pathlib import Path
import seaborn as sns
import matplotlib.pyplot as plt
from tqdm import tqdm
```

[2]:
```
def get_vessel_type_from_full_path(path):
    res = get_vessel_type(path.split("/")[-1])
    if not res:
        res = get_vessel_type(path.split("/")[-2])
    return res

def get_vessel_type(name):
    if "cancer" in name.lower():
        return "Cancer"
    if "artery" in name.lower():
        return "Artery"
    if "vein" in name.lower():
        return "Vein"
    if "isv" in name.lower():
        return "ISV"
    return False
```

[3]:
```
parent = Path("/media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/")
vessels = sorted({p.parent for p in parent.glob("**/*red ch_*.ims")})
data = []
for vessel in tqdm(vessels):
    try:
        data.append(pd.read_csv(vessel / "median_results.csv"))
        data[-1]["File"] = str(vessel).split("organised/7 DAY OLD Fish ")[1]
    except FileNotFoundError:
        print("No data for", vessel, flush=True)
```

```
  0%|
| 0/111 [00:00<?, ?it/s]
```

```
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 1 complete/Cancer region/Cancer vessel 1
```

```
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 1 complete/Caudal vein
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 1 complete/Intersegmental vessels/ISV1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 1 complete/Intersegmental vessels/ISV2
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 1 complete/Intersegmental vessels/ISV3
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 2/Tumor vessels/Cancer vessel 1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 2/Tumor vessels/Cancer vessel 10
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 3 Cancer region/Cancer region
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 3 Cancer region/Cancer region/Cancer Vessel 1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 3 Cancer region/Cancer region/Stack of the vessel
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 3 Cancer region/Intersegmental vessels healthy
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 3 Cancer region/Intersegmental vessels healthy/ISV1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 3 Cancer region/Intersegmental vessels healthy/ISV2
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 4/Caudal artery/Caudal artery imaging 1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 4/Caudal artery/Caudal artery imaging 2
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 4/Caudal vein/Caudal vein 1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 4/Caudal vein/Caudal vein 2
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 4/Healthy intersegmental vessel
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 1
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 2
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 3
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 4
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 5
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 6
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 5/Cancer vessel 7
```

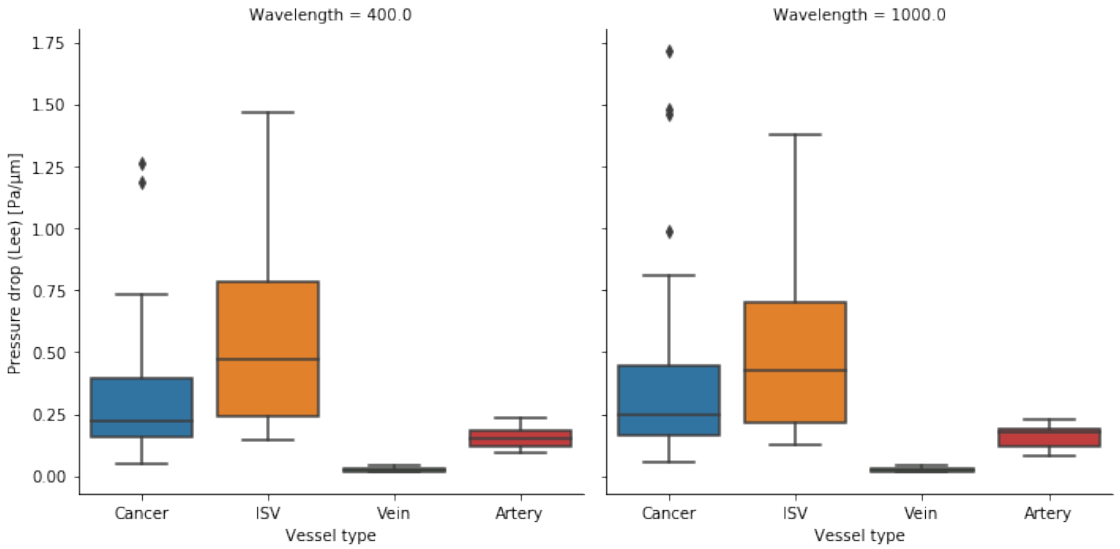
```
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 6/Healthy caudal artery
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
with tumors/Fish 6/Healthy caudal vein

 50%|
| 55/111 [00:00<00:00, 538.39it/s]

No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 3/vein/1000
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 3/vein/400
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 4/Vein/1000
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 4/Vein/400
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 5
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 6
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 7
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 9/ISV 2/1000
No data for /media/yngve/TOSHIBA EXT (YNGVE)/fish_data/organised/7 DAY OLD Fish
without tumors/Fish 9/ISV 2/400

100%|
 | 111/111 [00:00<00:00, 473.78it/s]
```

[4]:
```
results = pd.concat(data)
results["With tumour"] = results["File"].map(lambda x: "with " in x)
```

[5]:
```
results["Vessel type"] = results["File"].map(get_vessel_type_from_full_path)
```

[13]:
```
plt.figure(figsize=(8, 4.5), dpi=200)
sns.catplot(x="Vessel type", y="Pressure drop (Lee) [Pa/µm]", col="Wavelength",␣
 ↪data=results, kind="box")
```

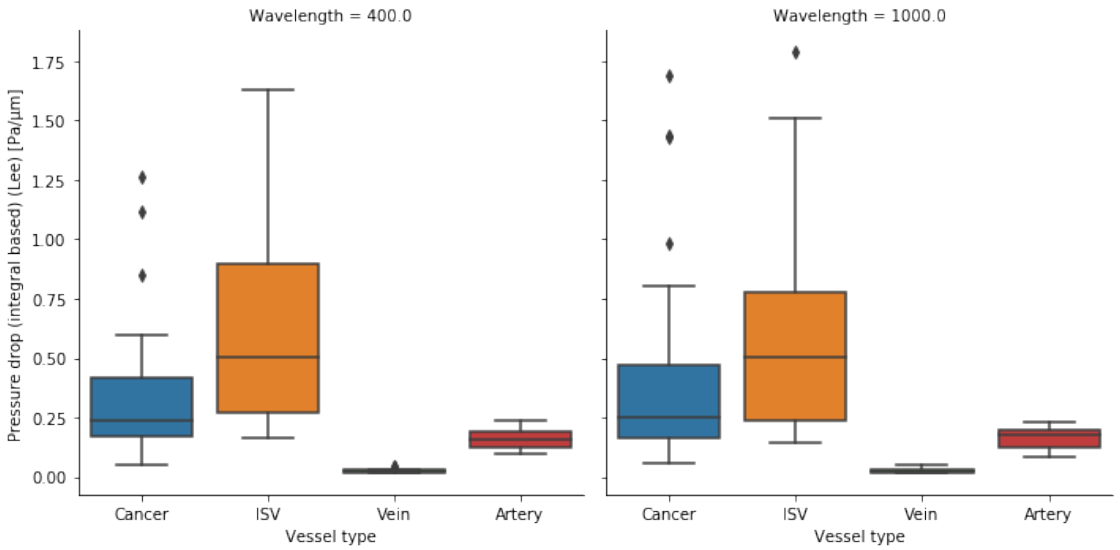
[13]:
```
<seaborn.axisgrid.FacetGrid at 0x7f943ac30610>

<Figure size 1600x900 with 0 Axes>
```



[17]:
```
plt.figure(figsize=(8, 4.5), dpi=200)
sns.catplot(x="Vessel type", y="Pressure drop (integral based) (Lee) [Pa/µm]",␣
↪col="Wavelength", data=results, kind="box")
```

[17]: <seaborn.axisgrid.FacetGrid at 0x7f93e04377f0>

<Figure size 1600x900 with 0 Axes>

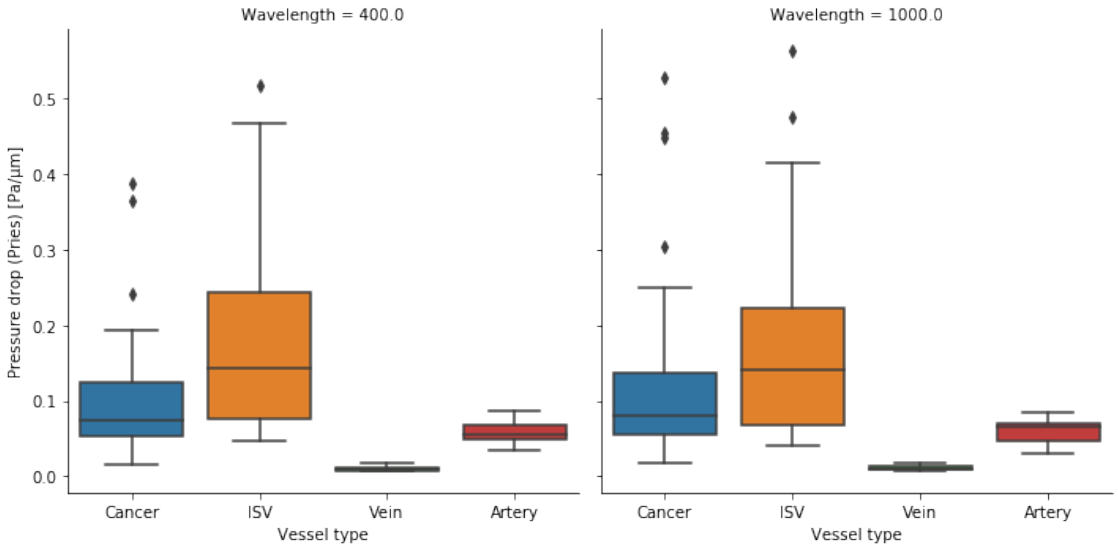


[14]:
```
plt.figure(figsize=(8, 4.5), dpi=200)
```

```
sns.catplot(x="Vessel type", y="Pressure drop (Pries) [Pa/µm]",␣
↪col="Wavelength", data=results, kind="box")
```

[14]: <seaborn.axisgrid.FacetGrid at 0x7f93e0444190>

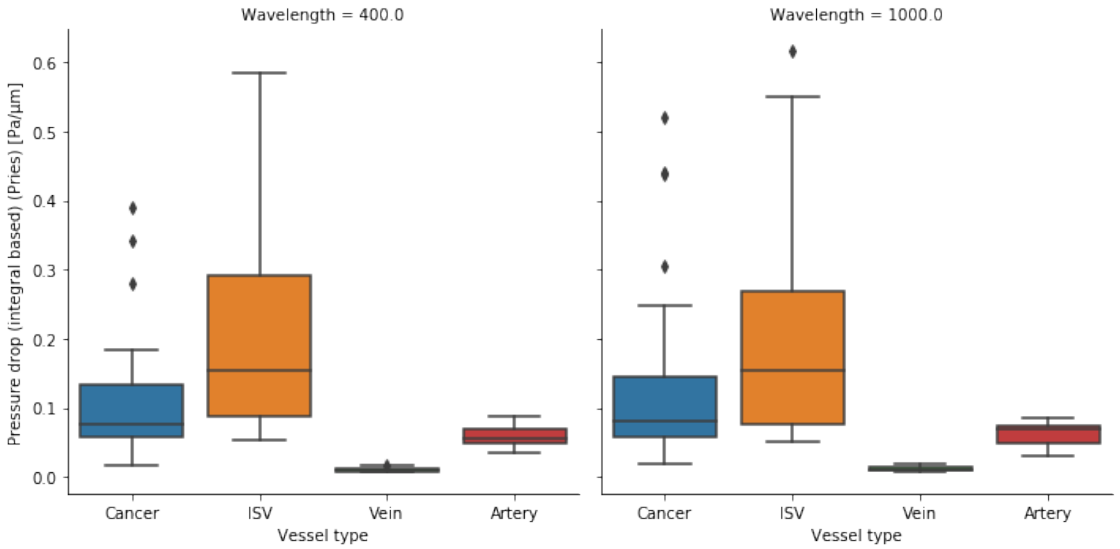
<Figure size 1600x900 with 0 Axes>



[18]:
```
plt.figure(figsize=(8, 4.5), dpi=200)
sns.catplot(x="Vessel type", y="Pressure drop (integral based) (Pries) [Pa/
↪µm]", col="Wavelength", data=results, kind="box")
```

[18]: <seaborn.axisgrid.FacetGrid at 0x7f93e035ff70>

<Figure size 1600x900 with 0 Axes>



[16]:
```
results.groupby(["Vessel type", "Wavelength"]).median()[[
    'v [µm/s]',
    'Distance to centerline [µm]',
    'Max R [µm]',
    "Pressure drop (Lee) [Pa/µm]",
    "Pressure drop (Pries) [Pa/µm]",
    "Pressure drop (integral based) (Lee) [Pa/µm]",
    "Pressure drop (integral based) (Pries) [Pa/µm]"
]]
```

[16]:

Vessel type	Wavelength	v [µm/s]	Distance to centerline [µm]	Max R [µm]	\
Artery	400.0	486.509745	3.600660	8.241000	
	1000.0	504.676206	3.444657	7.738500	
Cancer	400.0	267.369246	1.620514	4.832368	
	1000.0	259.704351	1.634375	4.832368	
ISV	400.0	242.651515	1.420852	3.411083	
	1000.0	241.383397	1.333960	3.486406	
Vein	400.0	183.155222	4.041948	12.693273	
	1000.0	229.797579	4.489647	12.693273	

Vessel type	Wavelength	Pressure drop (Lee) [Pa/µm]	\
Artery	400.0	0.153971	
	1000.0	0.178876	
Cancer	400.0	0.218760	
	1000.0	0.249135	
ISV	400.0	0.467946	
	1000.0	0.425801	

```
Vein        400.0                          0.022818
            1000.0                         0.023459

                         Pressure drop (Pries) [Pa/µm]  \
Vessel type Wavelength
Artery      400.0                            0.054656
            1000.0                           0.065171
Cancer      400.0                            0.073617
            1000.0                           0.080513
ISV         400.0                            0.143319
            1000.0                           0.141487
Vein        400.0                            0.009348
            1000.0                           0.009611

                         Pressure drop (integral based) (Lee) [Pa/µm]  \
Vessel type Wavelength
Artery      400.0                                          0.159300
            1000.0                                         0.180114
Cancer      400.0                                          0.239446
            1000.0                                         0.253394
ISV         400.0                                          0.504711
            1000.0                                         0.500796
Vein        400.0                                          0.024204
            1000.0                                         0.025718

                         Pressure drop (integral based) (Pries) [Pa/µm]
Vessel type Wavelength
Artery      400.0                                            0.056548
            1000.0                                           0.068356
Cancer      400.0                                            0.076033
            1000.0                                           0.081464
ISV         400.0                                            0.154712
            1000.0                                           0.153747
Vein        400.0                                            0.009916
            1000.0                                           0.010536
```

[ ]: