

# Multi-view Multi-scale CNN for Lung Nodule Type Classification from CT Images

## Supplementary Material

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## CONTENTS

|            |  |    |
|------------|--|----|
| <b>I</b>   | <b>Overview</b>  | 2  |
| I-A        | Full tests on LIDC-IDRI data set . . . . .               | 2  |
| I-B        | Full tests on ELCAP data set . . . . .                   | 2  |
| <b>II</b>  | <b><i>ms-nodulecircles</i> ON LIDC-IDRI</b>              | 3  |
| II-A       | Overall Statistics . . . . .                             | 3  |
| II-B       | Results . . . . .  | 3  |
| II-C       | Well-circumscribed for <i>ms-nodulecircles</i> . . . . . | 4  |
| II-D       | GGO for <i>ms-nodulecircles</i> . . . . .                | 7  |
| II-E       | Juxta-pleural for <i>ms-nodulecircles</i> . . . . .      | 9  |
| II-F       | Pleural-tail for <i>ms-nodulecircles</i> . . . . .       | 13 |
| II-G       | Vascularized for <i>ms-nodulecircles</i> . . . . .       | 16 |
| II-H       | Non-nodule for <i>ms-nodulecircles</i> . . . . .         | 19 |
| <b>III</b> | <b><i>ms-nodulecircles</i> on ELCAP</b>                  | 22 |
| III-A      | Overall Statistics . . . . .                             | 22 |
| III-B      | Results . . . . .  | 22 |
| III-C      | Well-circumscribed for <i>ms-nodulecircles</i> . . . . . | 23 |
| III-D      | GGO for <i>ms-nodulecircles</i> . . . . .                | 25 |
| III-E      | Juxta-pleural for <i>ms-nodulecircles</i> . . . . .      | 26 |
| III-F      | Pleural-tail for <i>ms-nodulecircles</i> . . . . .       | 28 |
| III-G      | Vascularized for <i>ms-nodulecircles</i> . . . . .       | 29 |
| III-H      | Non-nodule for <i>ms-nodulecircles</i> . . . . .         | 31 |

Click red titles to jump to corresponding sections.

## I. OVERVIEW

We have tested our method with three configurations, each followed by a multi-scale approach, resulting in total six configurations. Each configuration is tested on both LIDC-IDRI and ELCAP data set. Due to page limit, we have only shown the best results of configuration *ms-nodulecircles* on LIDC-IDRI and ELCAP.

For full results, please refer to our site (click the following link to jump to corresponding files on our site.).

### A. Full tests on LIDC-IDRI data set

- *nodules* on LIDC-IDRI
- *ms-nodules* on LIDC-IDRI
- *colornodules* on LIDC-IDRI
- *ms-colornodules* on LIDC-IDRI
- *nodulecircles* on LIDC-IDRI
- *ms-nodulecircles* on LIDC-IDRI

### B. Full tests on ELCAP data set

- *nodules* on ELCAP
- *ms-nodules* on ELCAP
- *colornodules* on ELCAP
- *ms-colornodules* on ELCAP
- *nodulecircles* on ELCAP
- *ms-nodulecircles* on ELCAP

## II. *ms-nodulecircles* ON LIDC-IDRI

### A. Overall Statistics

The confusion matrix for each type is shown in Table I. The overall classification rate is 92.1%. Results for all cases are shown. Scores are presented on the most right of the image. It should be noted that cases not correctly classified are labeled out using red rectangles.

TABLE I  
CONFUSION MATRIX FOR *ms-nodulecircles* ON LIDC-IDRI

| G | W           | N           | P           | V           | J           |
|---|-------------|-------------|-------------|-------------|-------------|
| G | <b>0.83</b> | 0.02        | 0.13        | 0.02        | 0.00        |
| W | 0.01        | <b>0.97</b> | 0.01        | 0.00        | 0.02        |
| N | 0.00        | 0.01        | <b>0.99</b> | 0.00        | 0.00        |
| P | 0.00        | 0.00        | 0.10        | <b>0.90</b> | 0.00        |
| V | 0.01        | 0.06        | 0.01        | 0.00        | <b>0.92</b> |
| J | 0.00        | 0.00        | 0.09        | 0.01        | 0.00        |

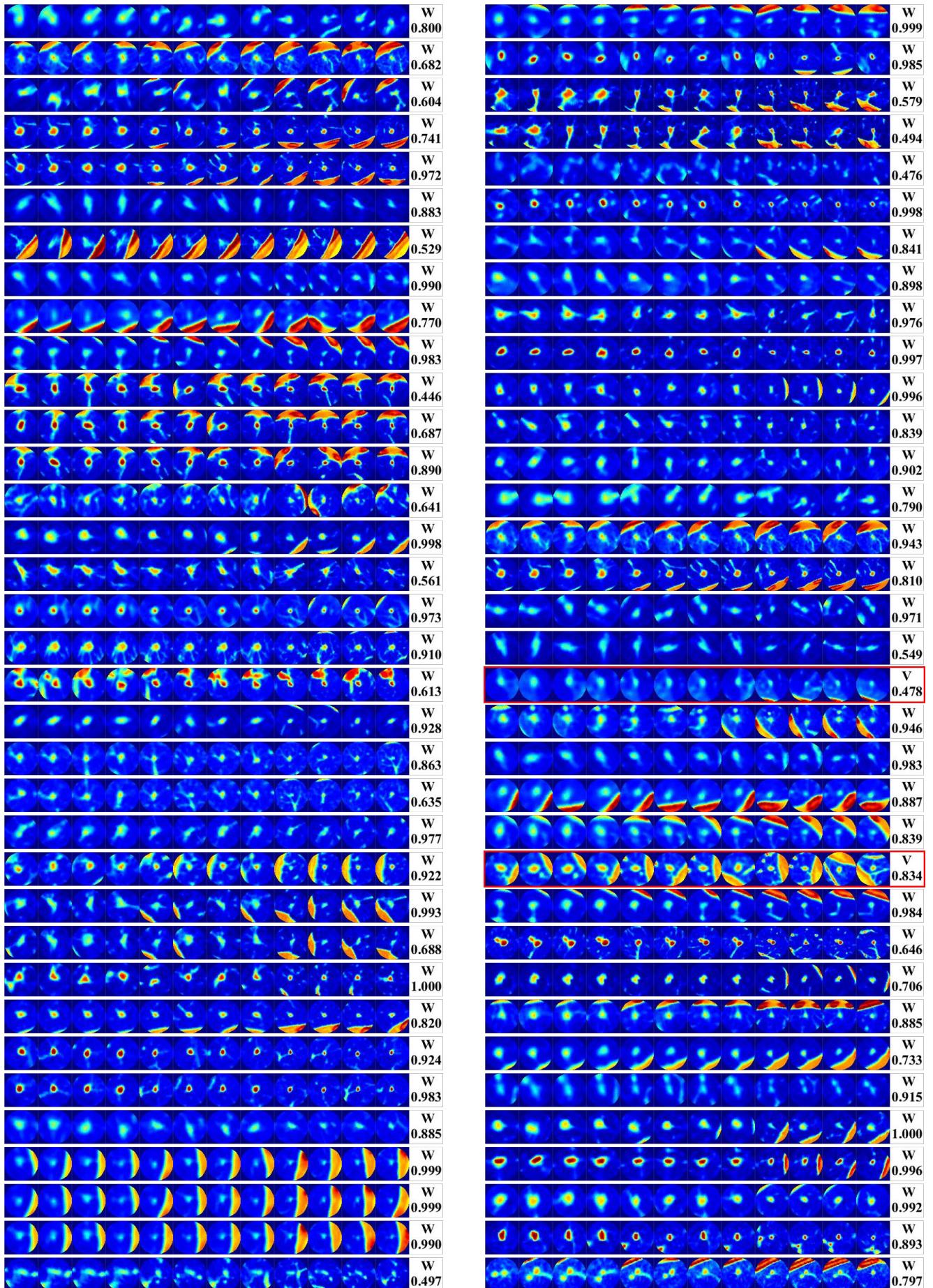
G = Ground glass optic      W = Well-circumscribed      N = Non-nodule  
 P = Pleural-tail              V = Vascularized              J = Juxta-pleural

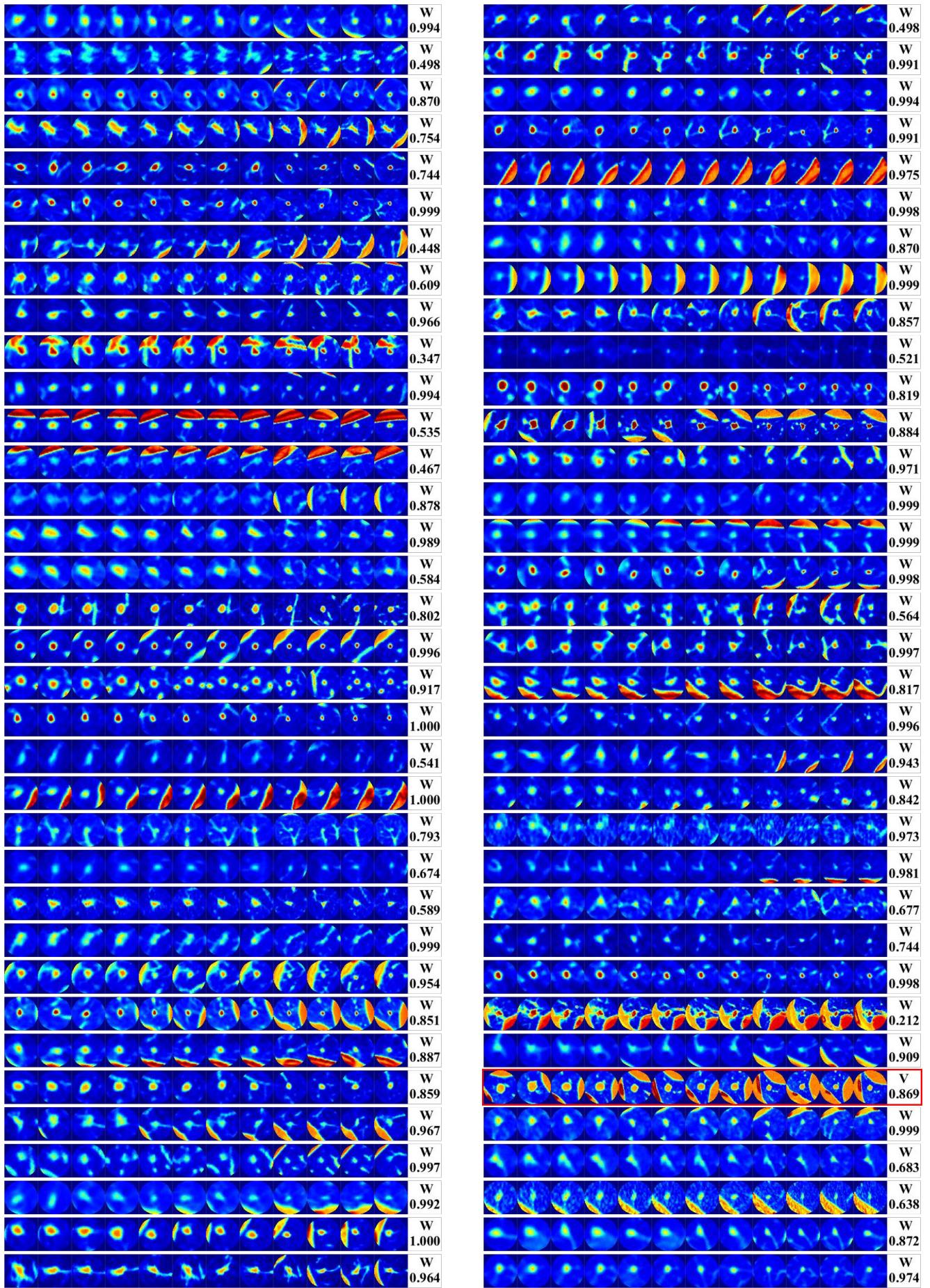
### B. Results

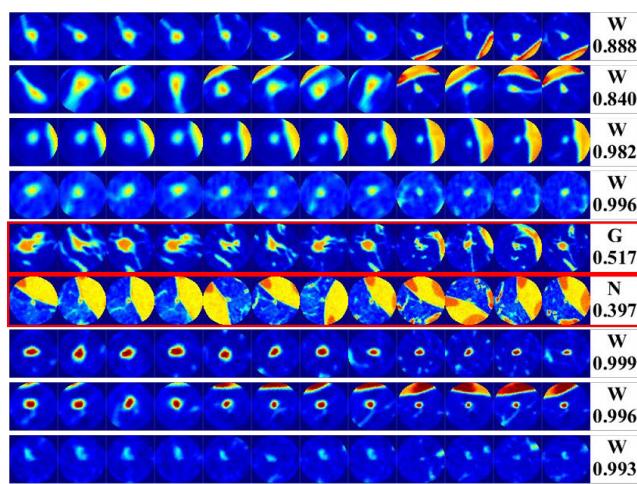
**Click highlighted link to jump to corresponding section.**

- [II-C](#) Well-circumscribed
- [II-D](#) GGO
- [II-E](#) Juxta-pleural
- [II-F](#) Pleural-tail
- [II-G](#) Vascularized
- [II-H](#) Non-nodule

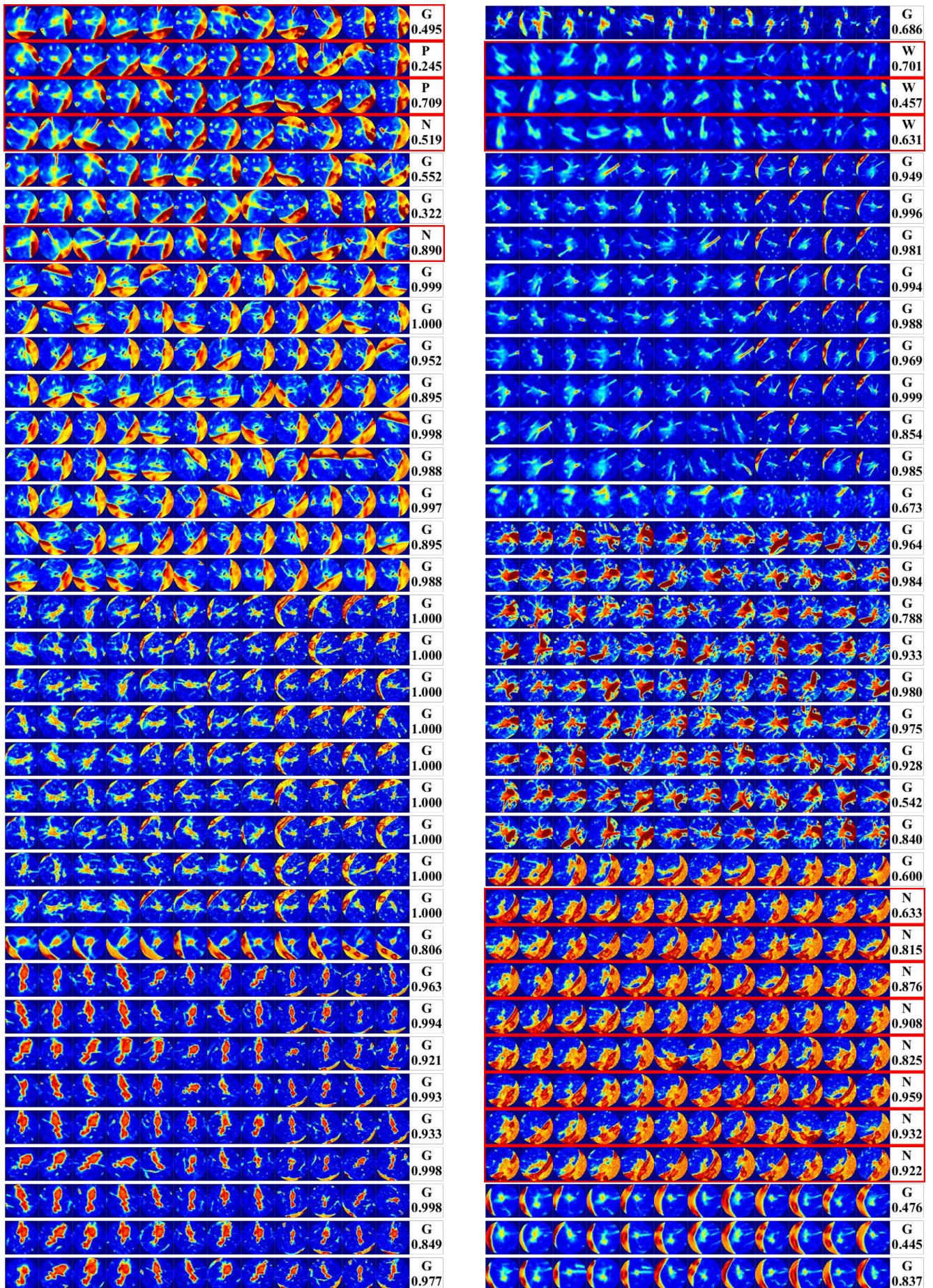
C. Well-circumscribed for ms-nodulecircles

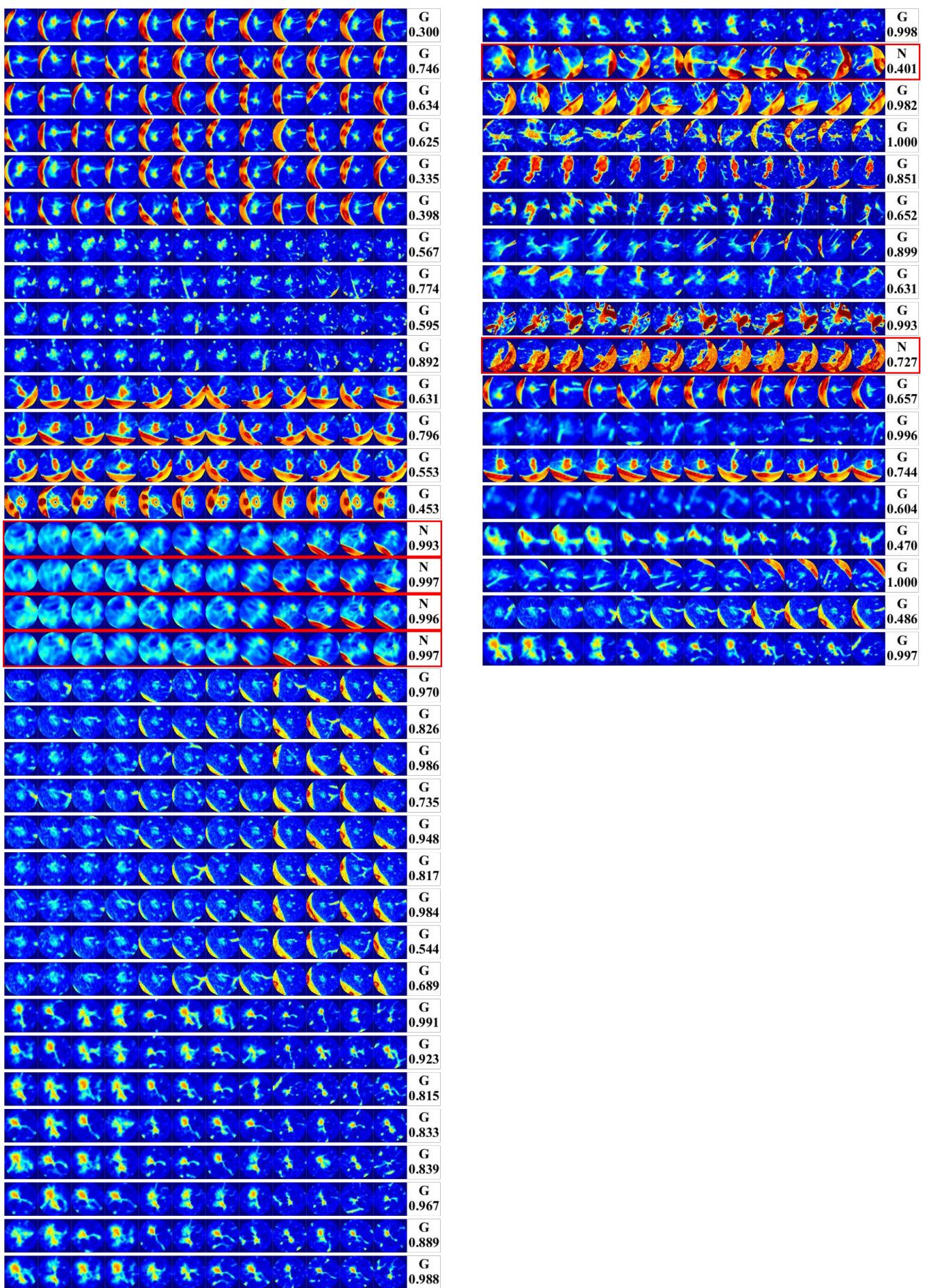




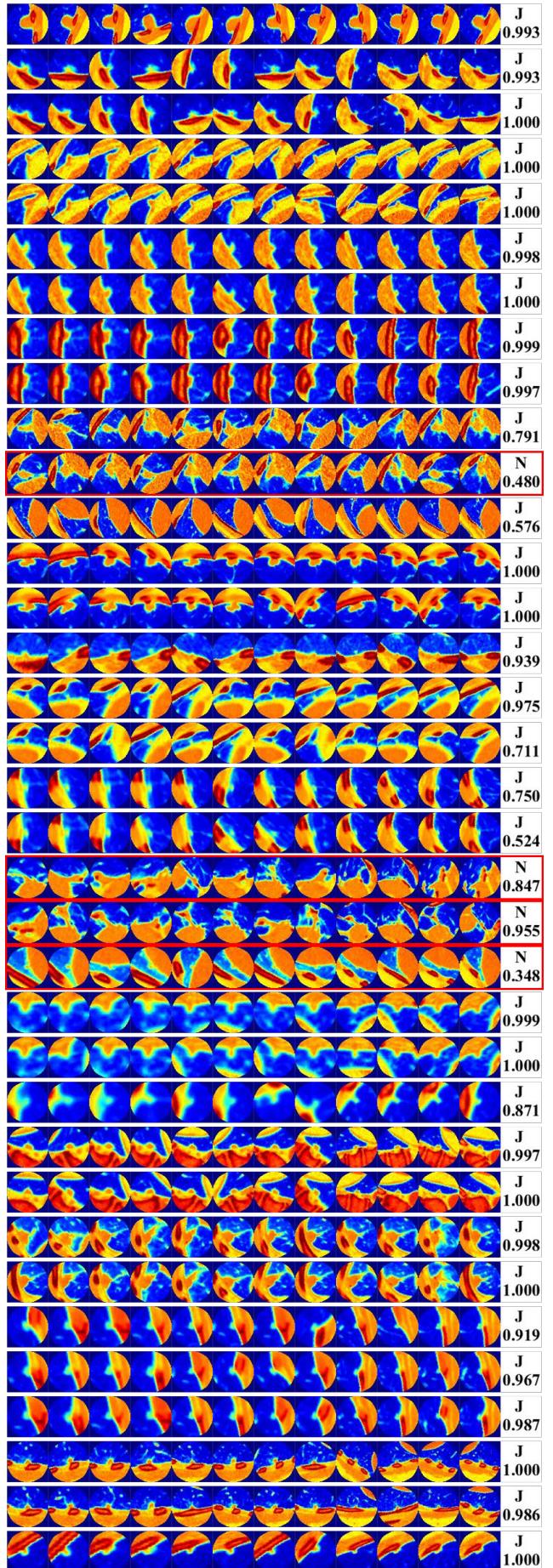
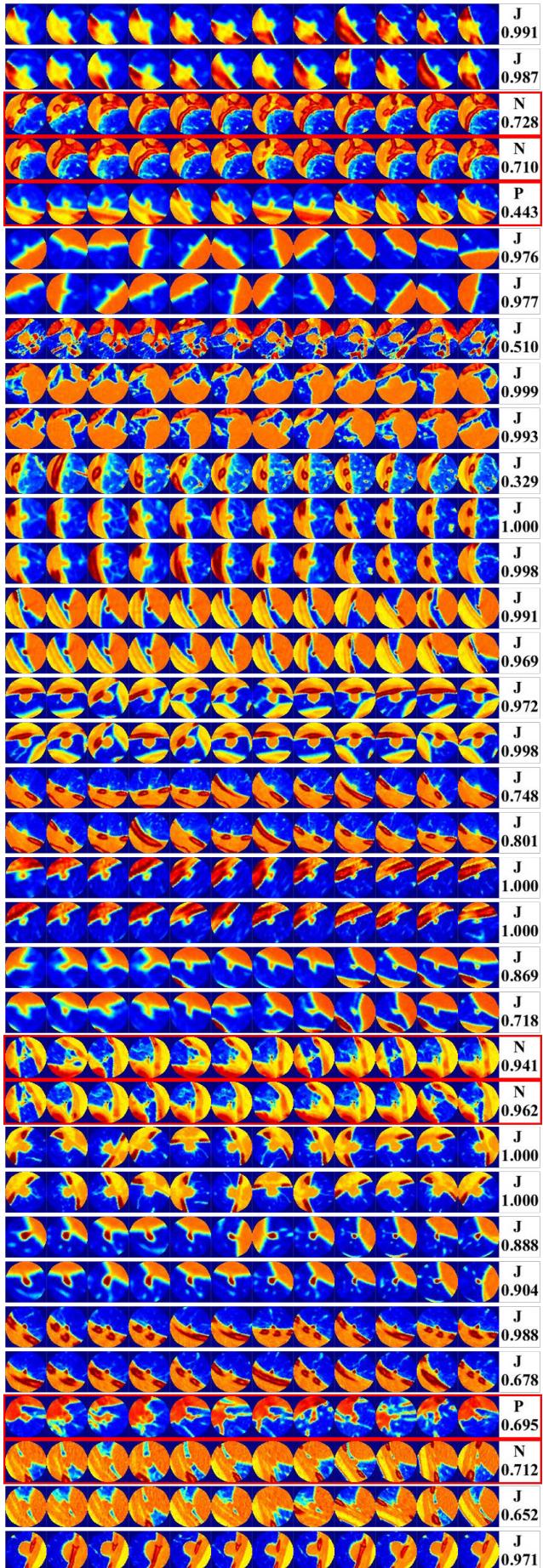


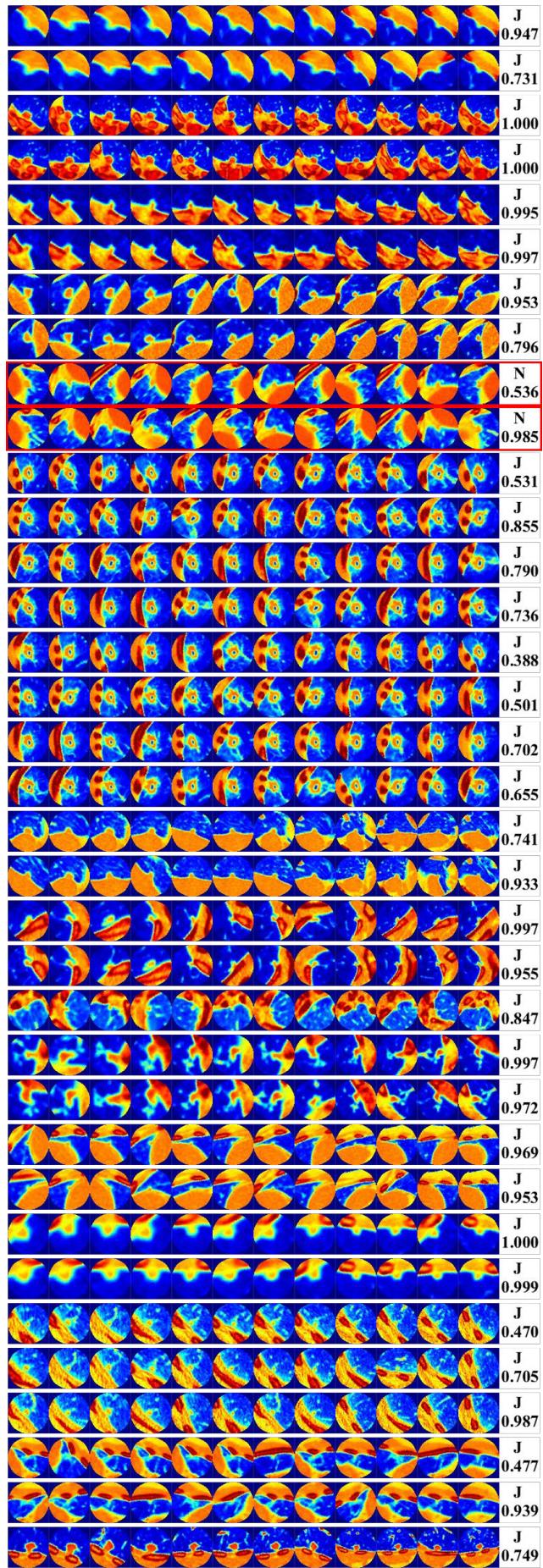
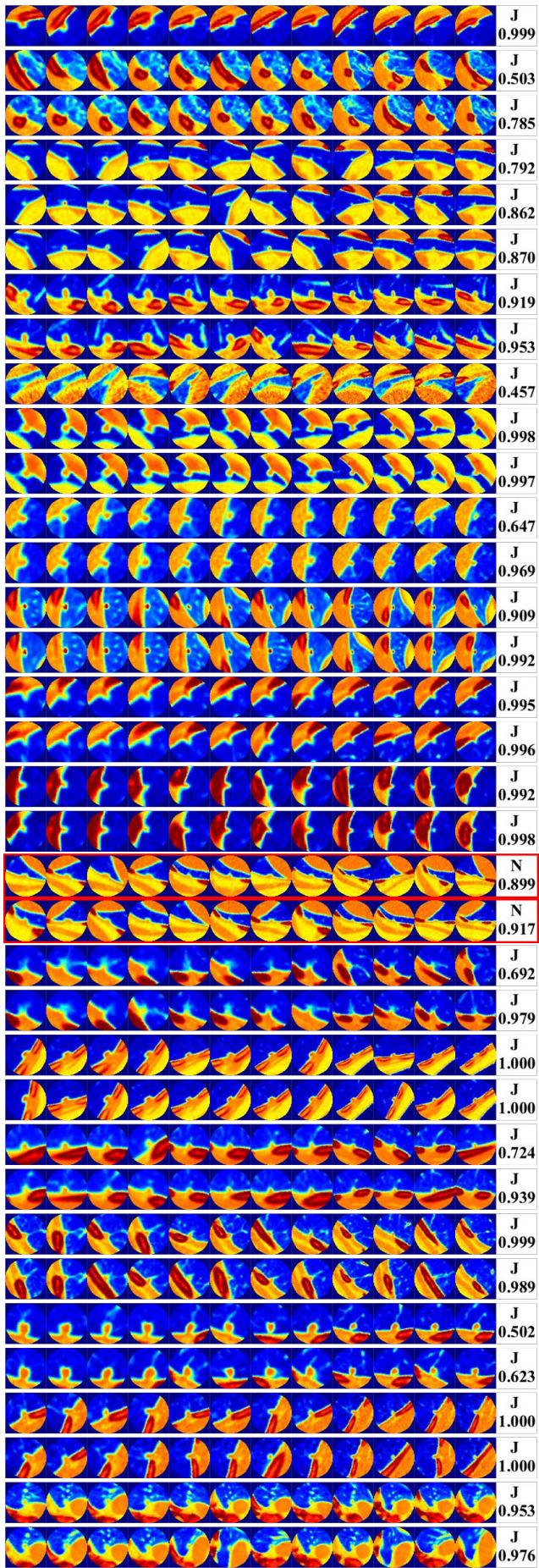
#### D. GGO for ms-nodulecircles

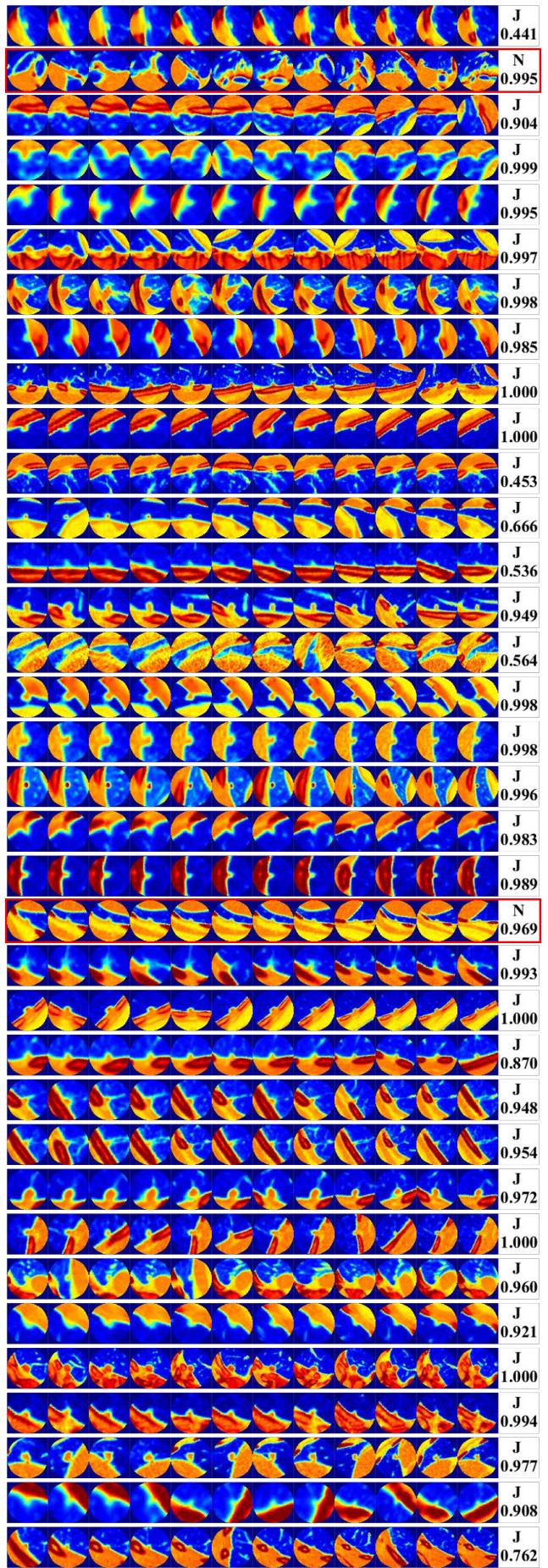
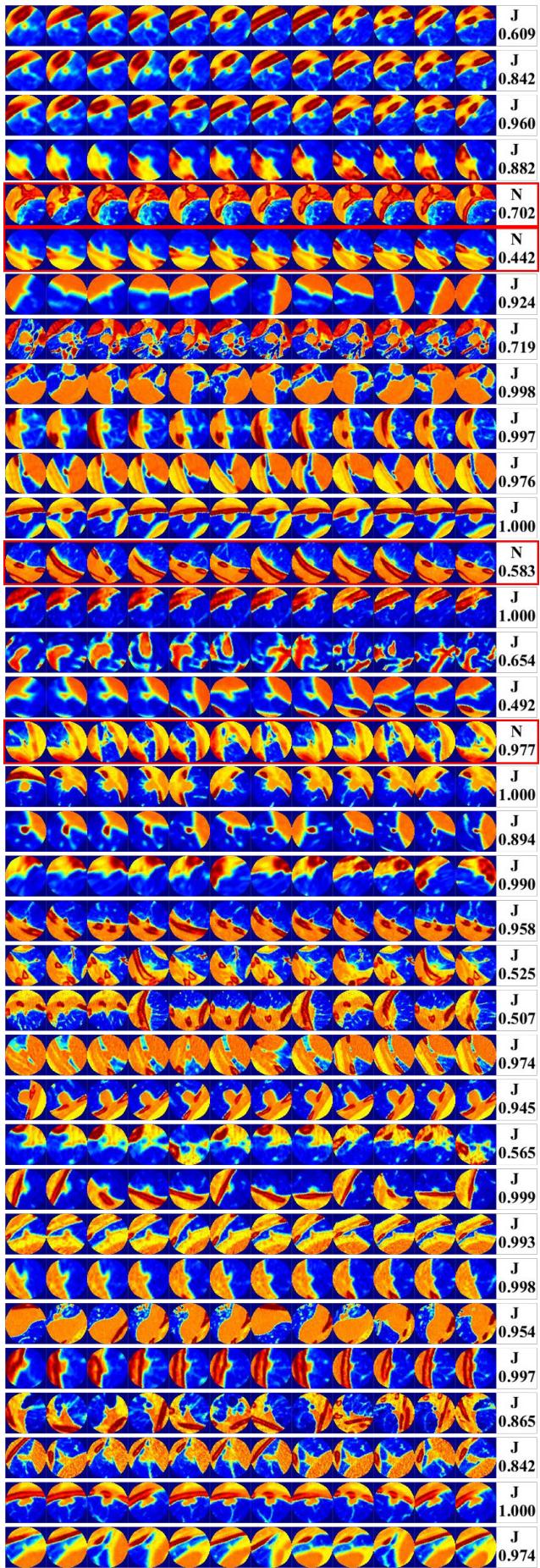


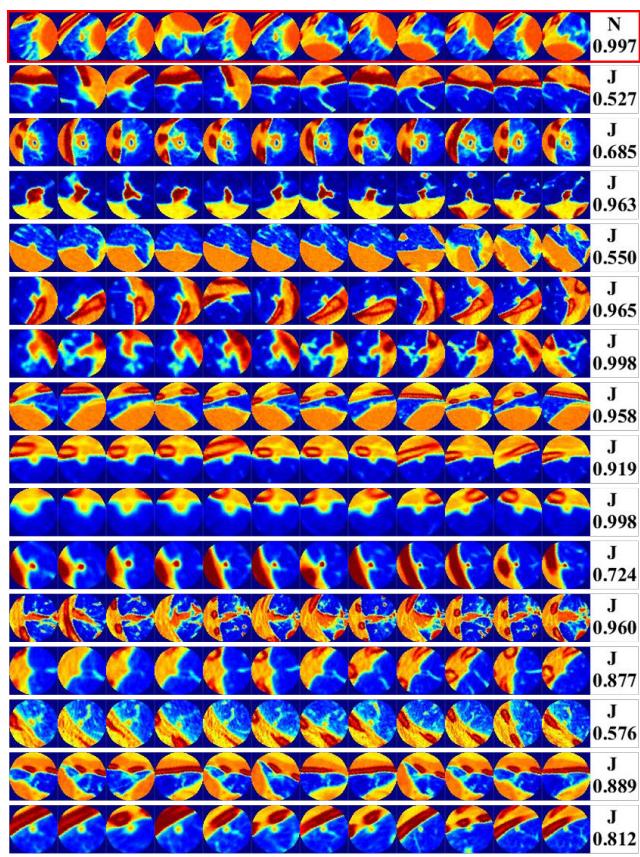


E. Juxta-pleural for ms-nodulecircles

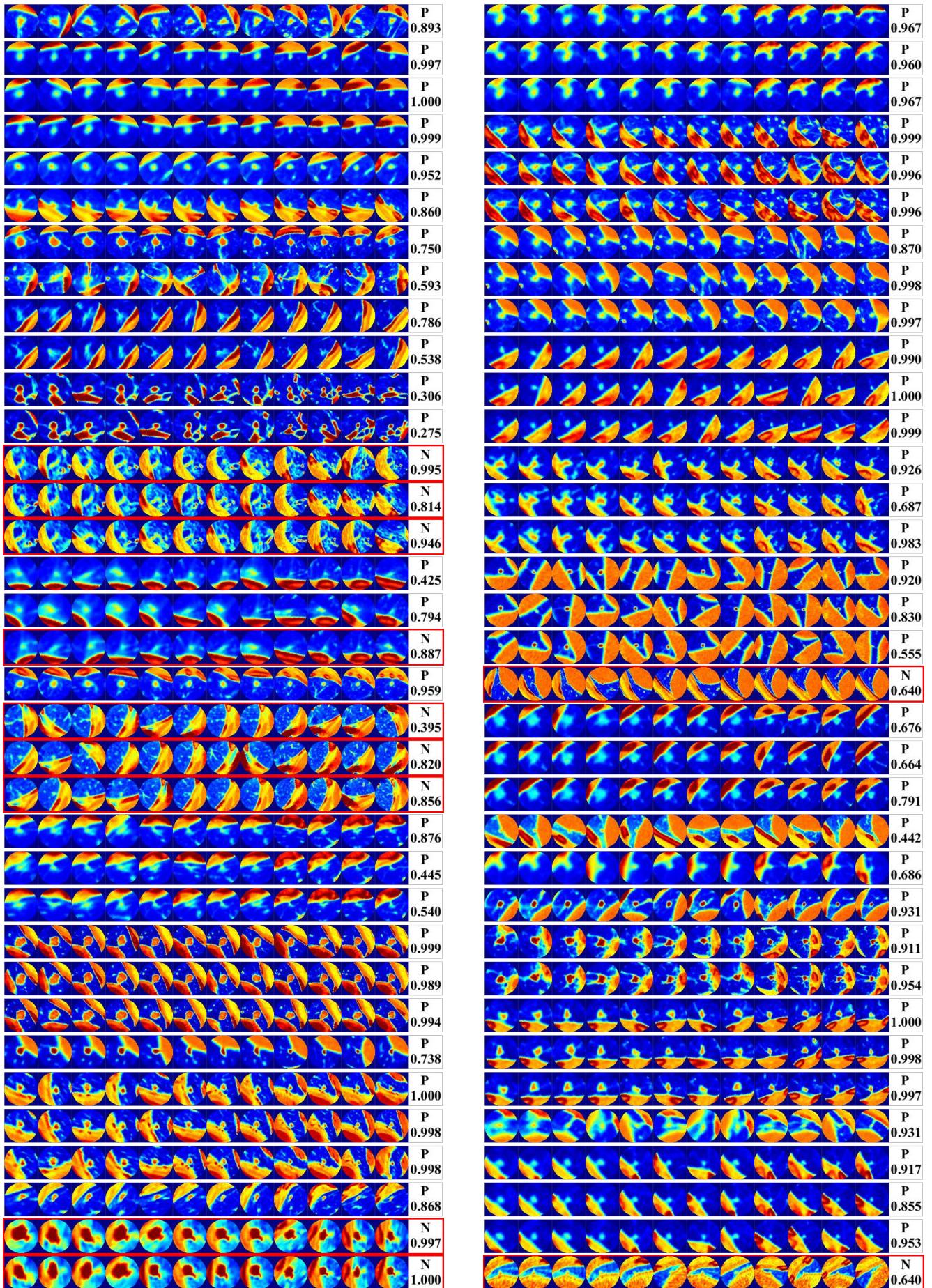


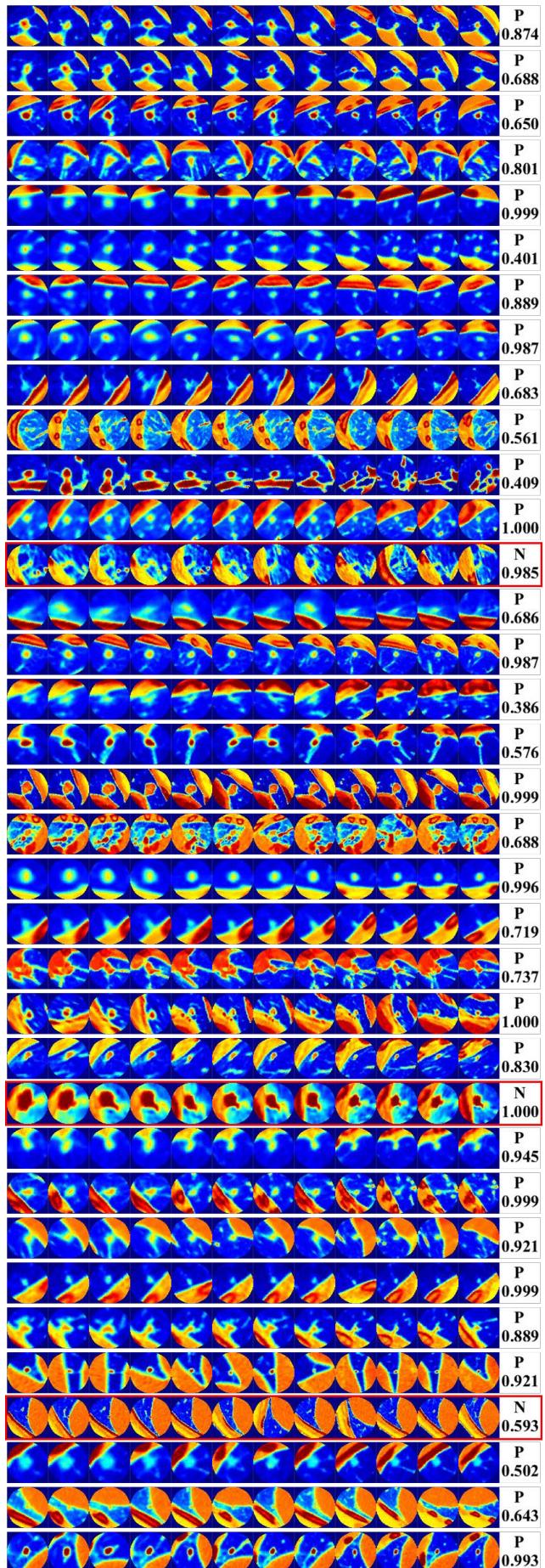
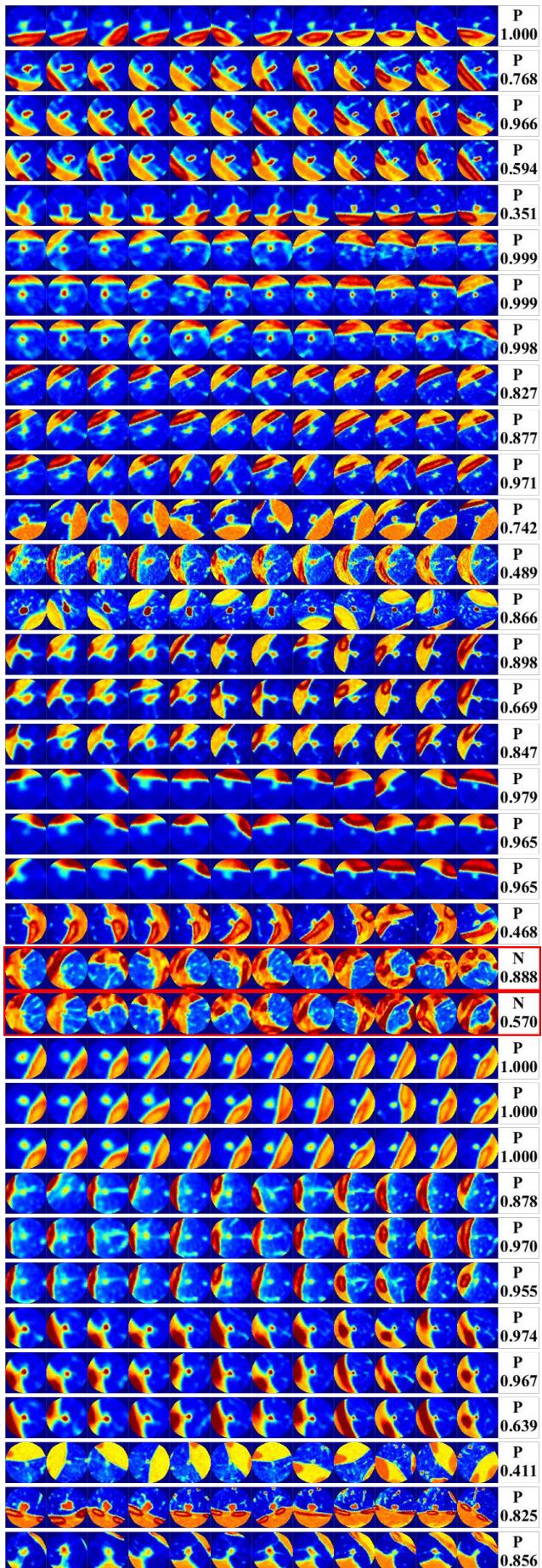


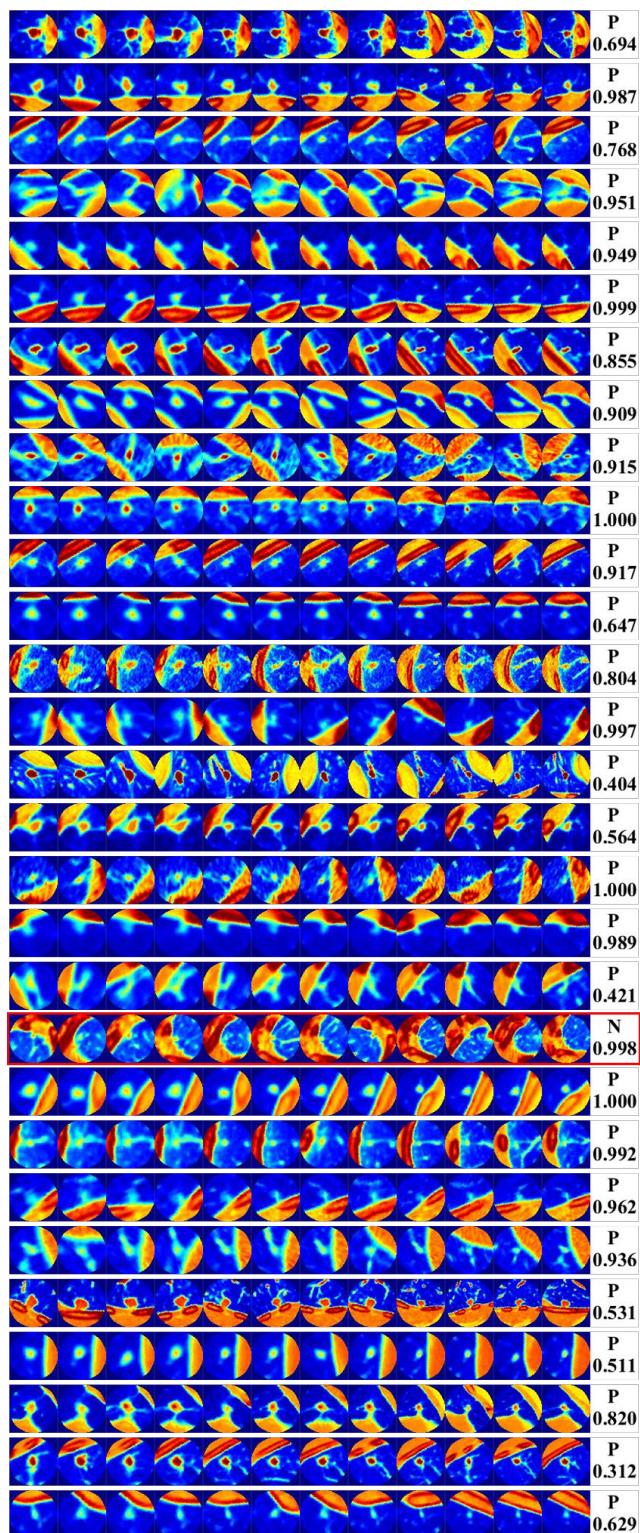




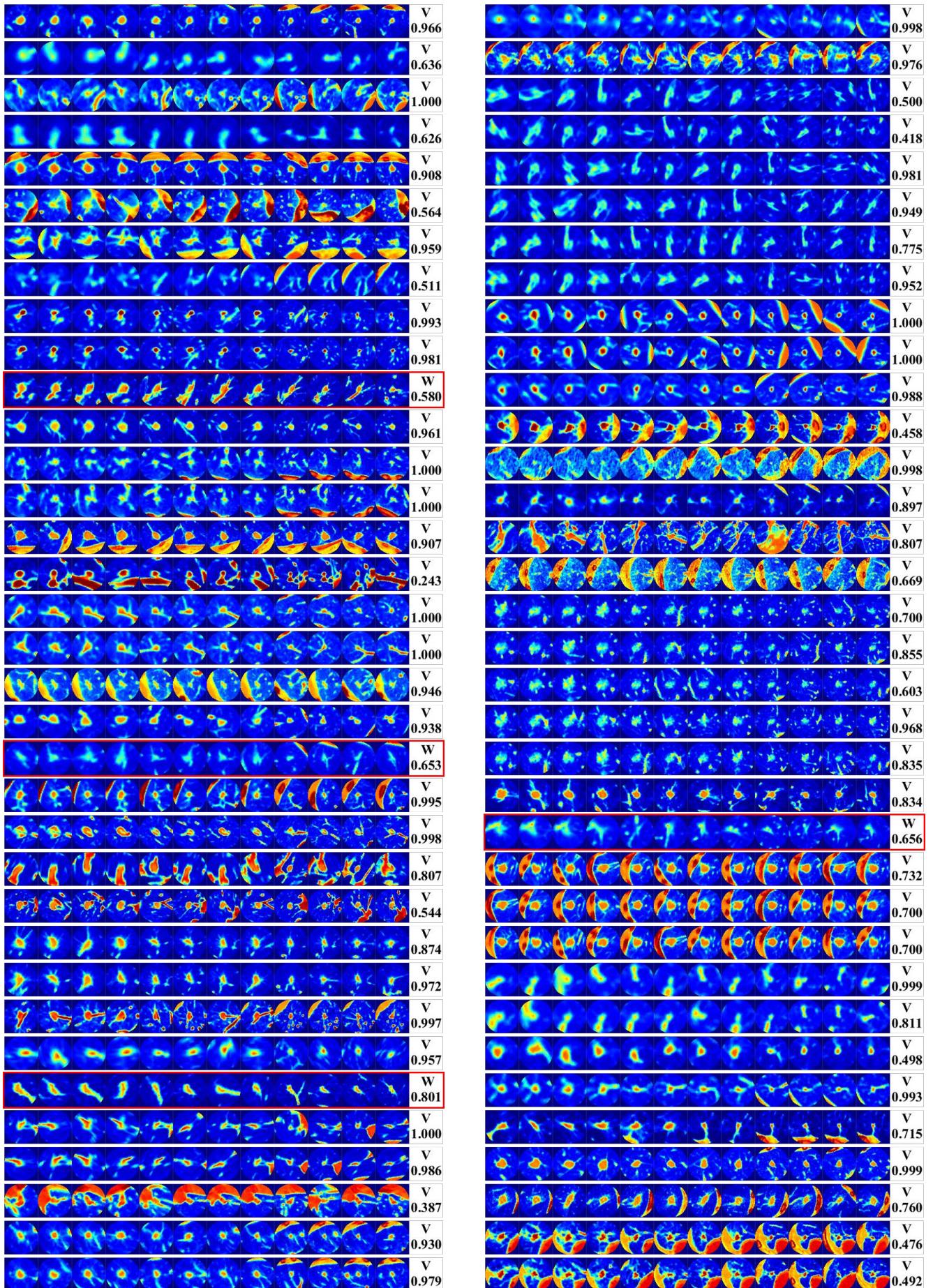
F. Pleural-tail for ms-nodulecircles

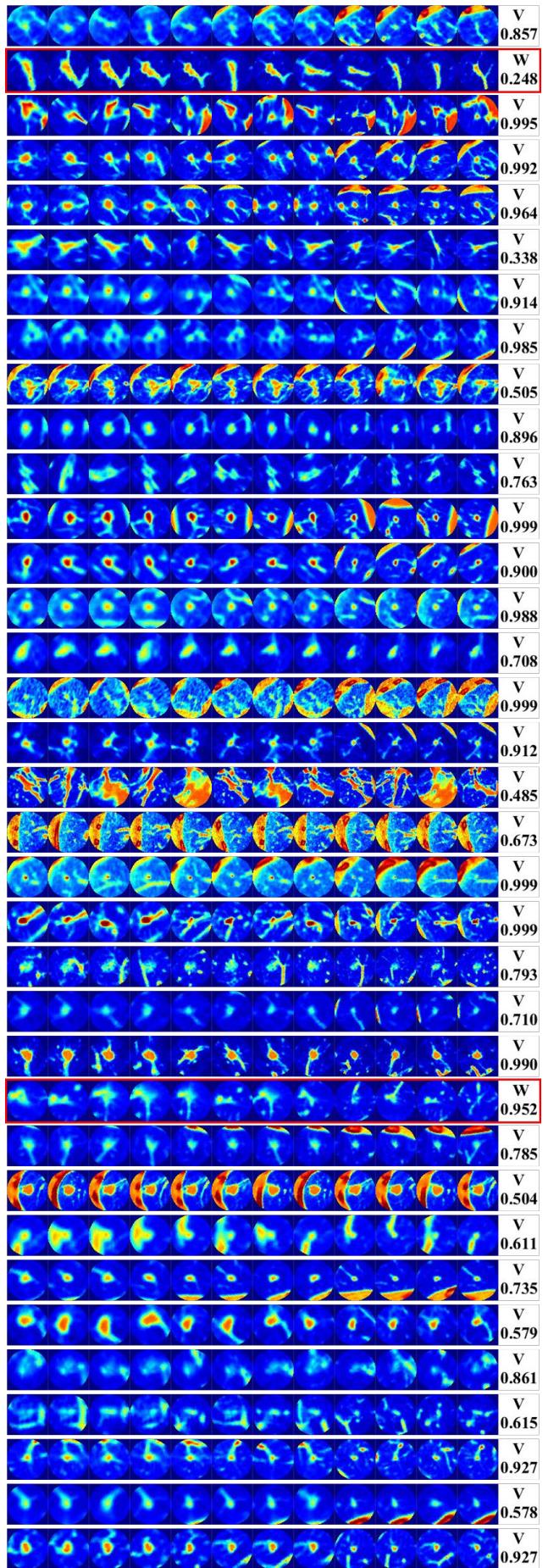
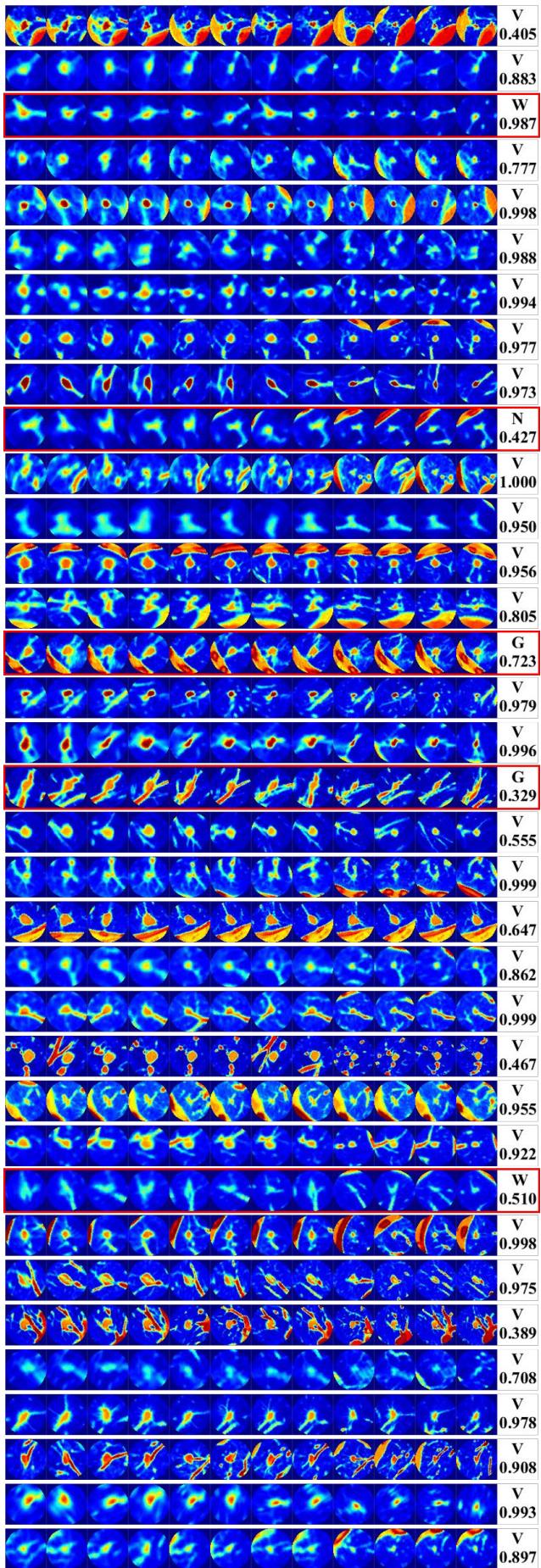


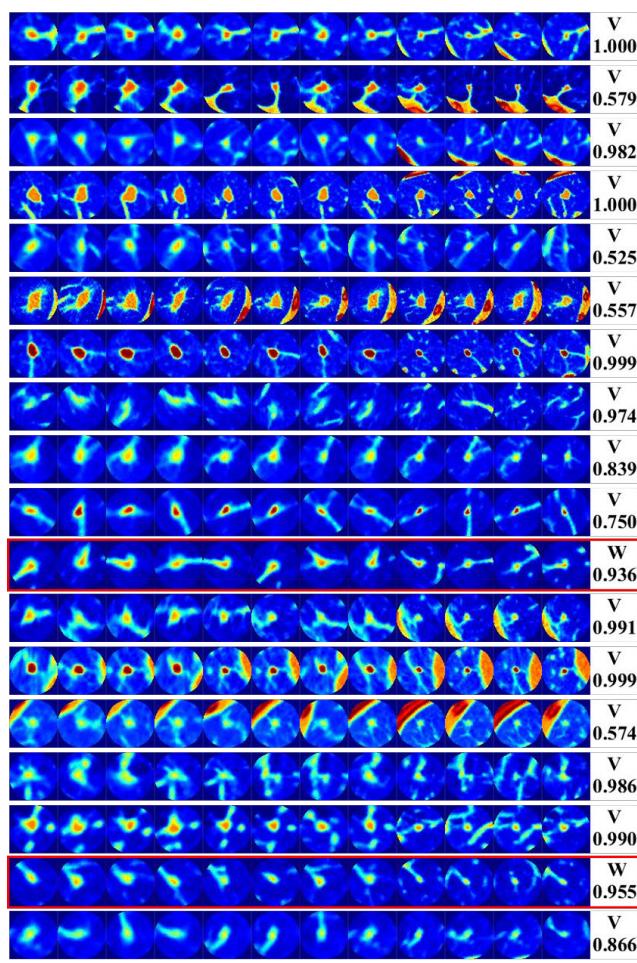




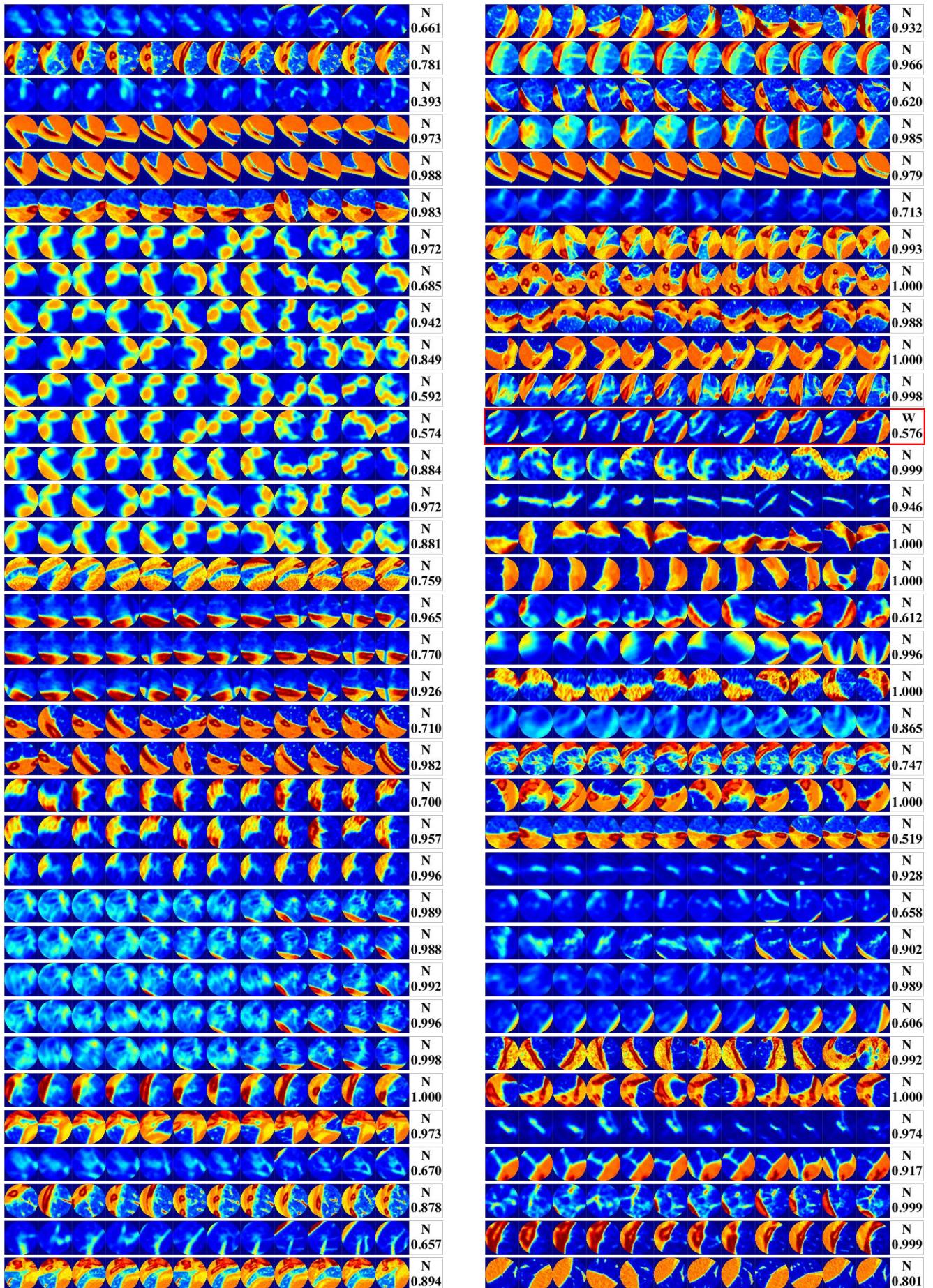
G. Vascularized for ms-nodulecircles

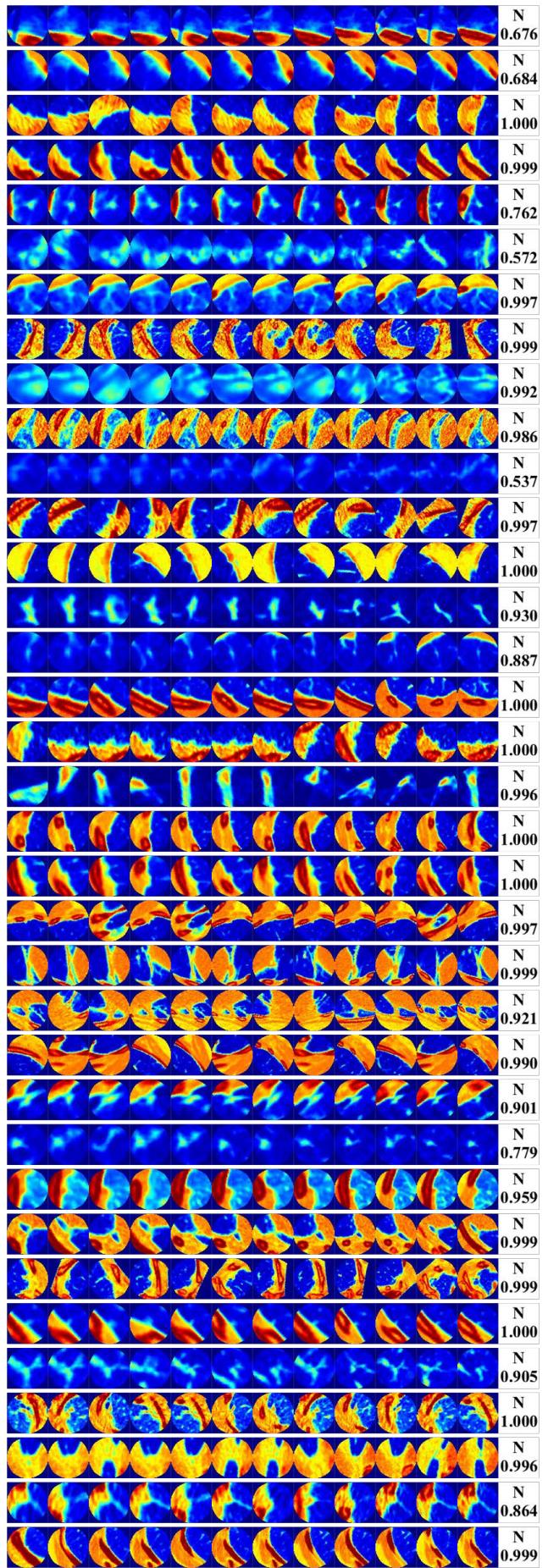
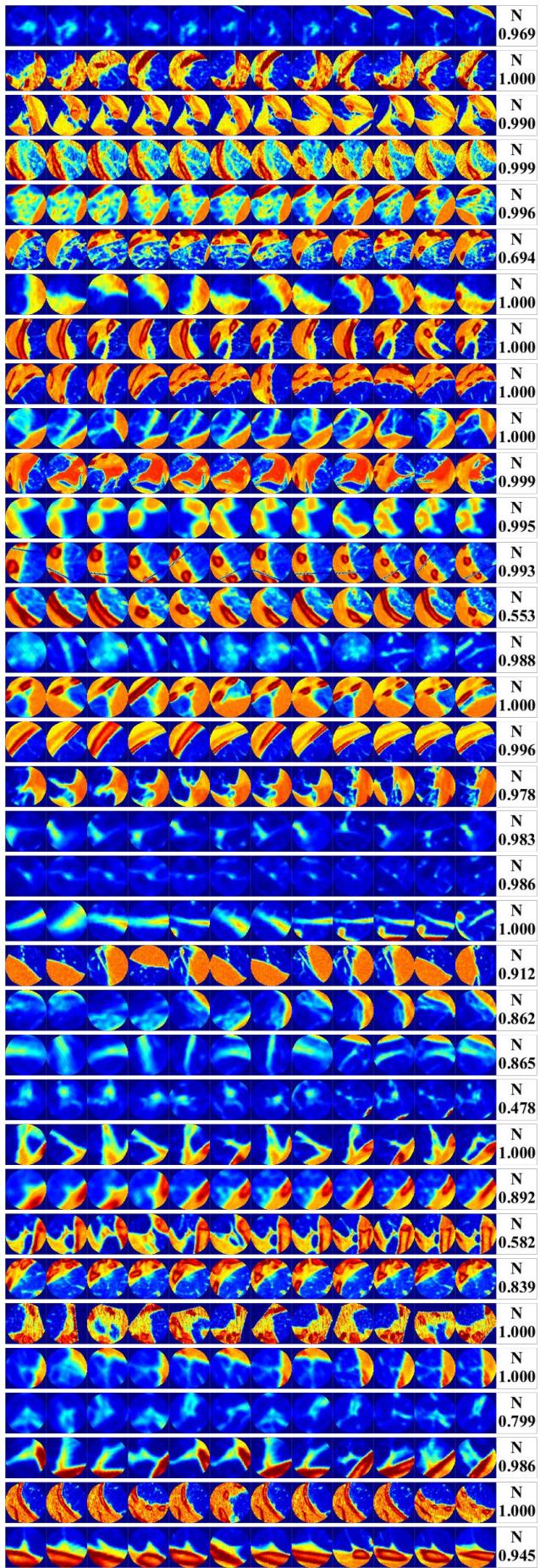


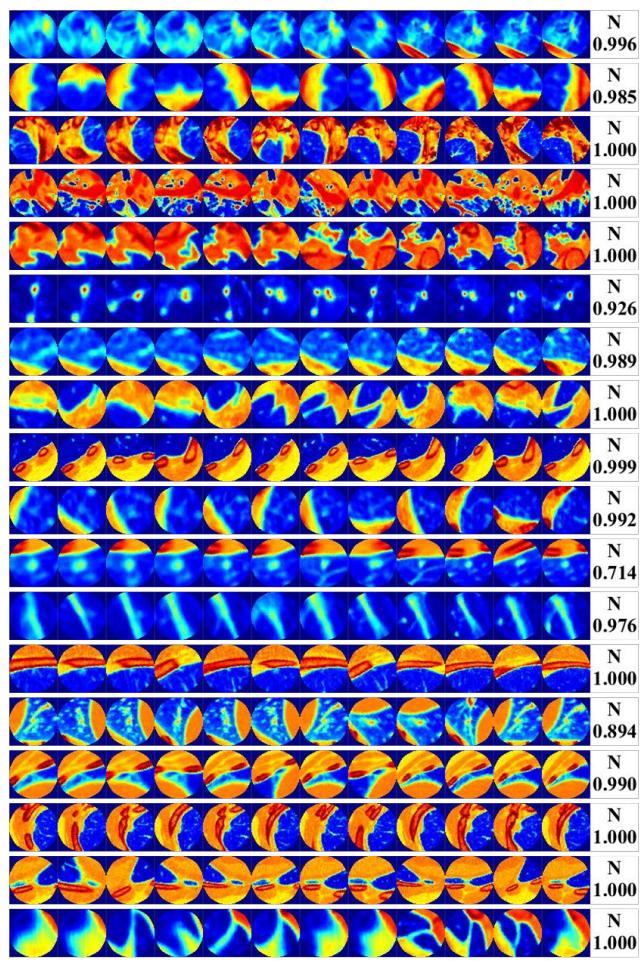




H. Non-nodule for ms-nodulecircles







### III. *ms-nodulecircles* ON ELCAP

#### A. Overall Statistics

The confusion matrix for each type is shown in Table II. The overall classification rate is 90.9%. Results for all cases are shown. Scores are presented on the most right of the image. It should be noted that cases not correctly classified are labeled out using red rectangles.

TABLE II  
CONFUSION MATRIX FOR *ms-nodulescircles* ON ELCAP

| G | W    | N    | P    | V    | J    |      |
|---|------|------|------|------|------|------|
| G | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |      |
| W | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 |      |
| N | 0.04 | 0.04 | 0.92 | 0.01 | 0.00 |      |
| P | 0.02 | 0.00 | 0.06 | 0.92 | 0.00 |      |
| V | 0.05 | 0.00 | 0.02 | 0.00 | 0.93 | 0.00 |
| J | 0.04 | 0.00 | 0.20 | 0.00 | 0.00 | 0.76 |

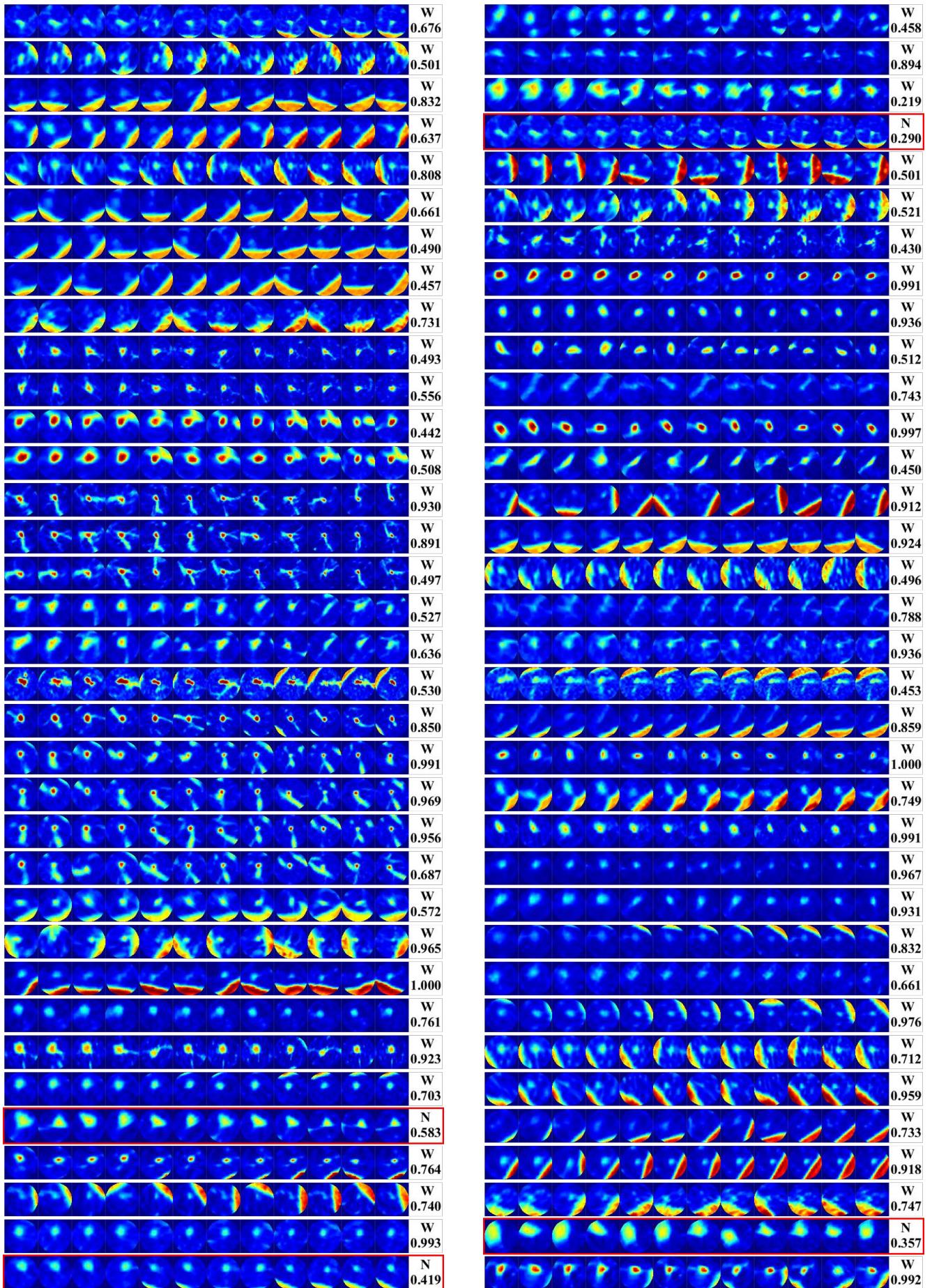
G = Ground glass optic    W = Well-circumscribed    N = Non-nodule  
P = Pleural-tail                  V = Vascularized                  J = Juxta-pleural

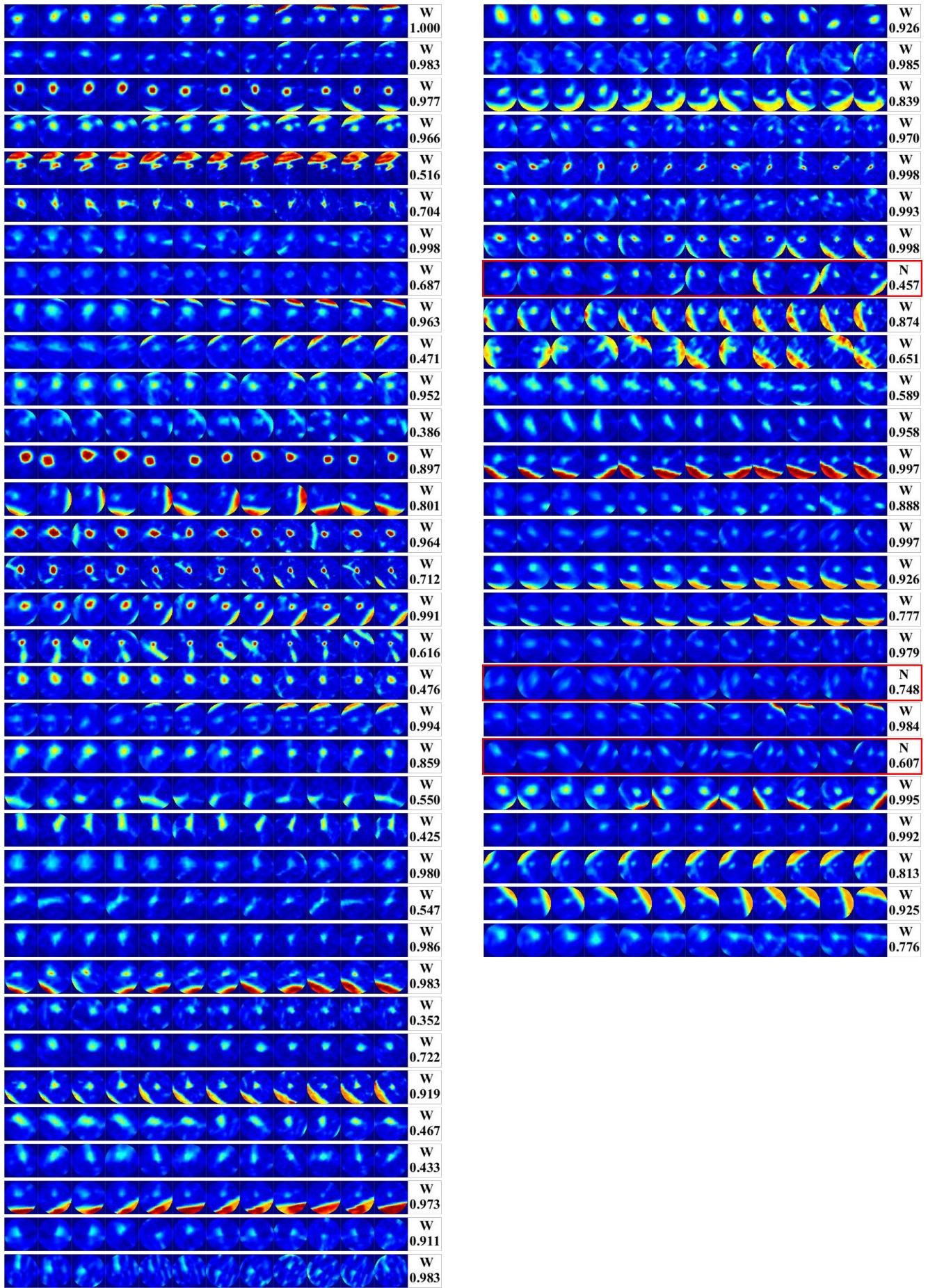
### B. Results

**Click highlighted link to jump to corresponding section.**

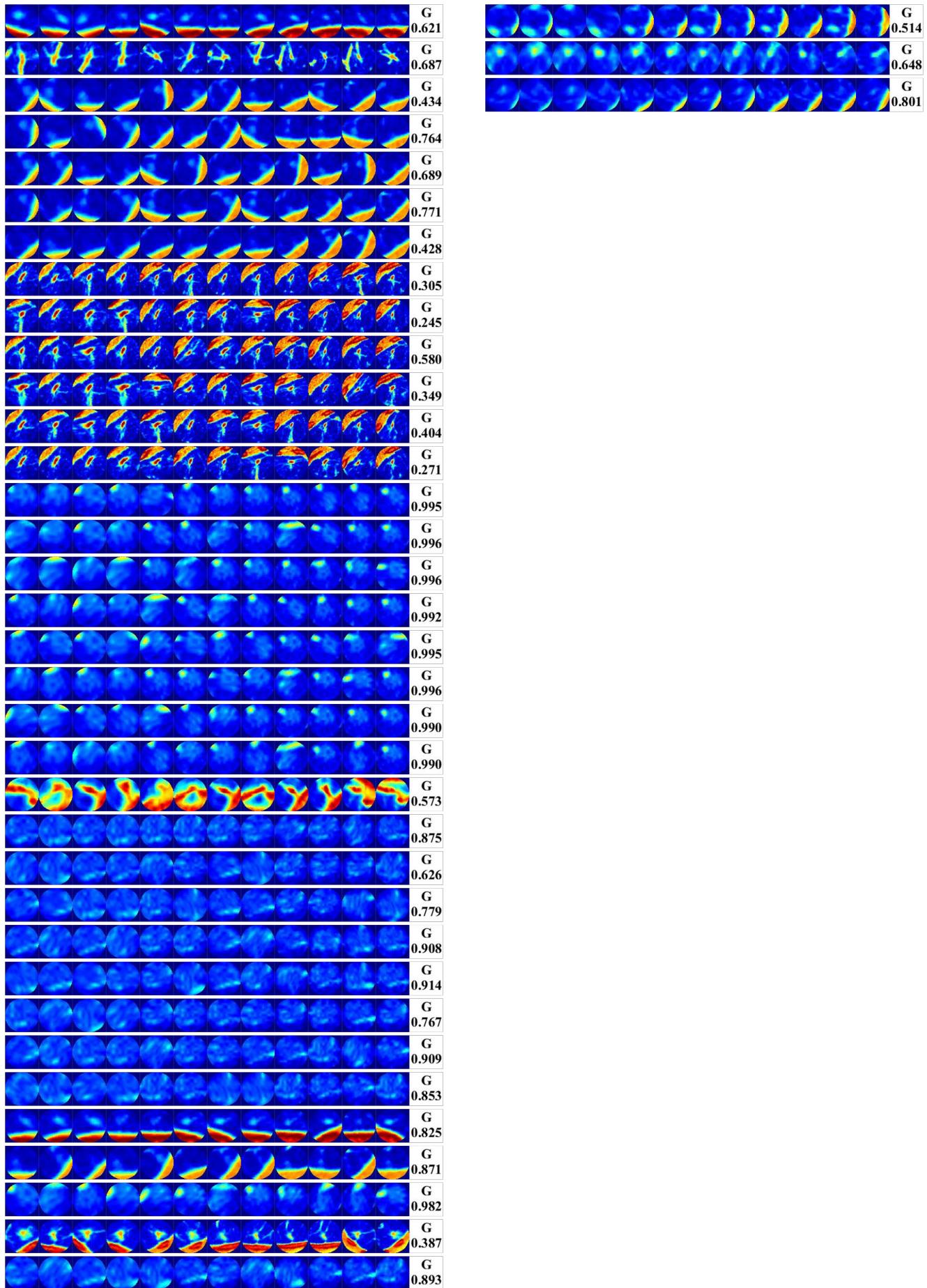
- III-C Well-circumscribed
  - III-D GGO
  - III-E Juxta-pleural
  - III-F Pleural-tail
  - III-G Vascularized
  - III-H Non-nodule

C. Well-circumscribed for ms-nodulecircles

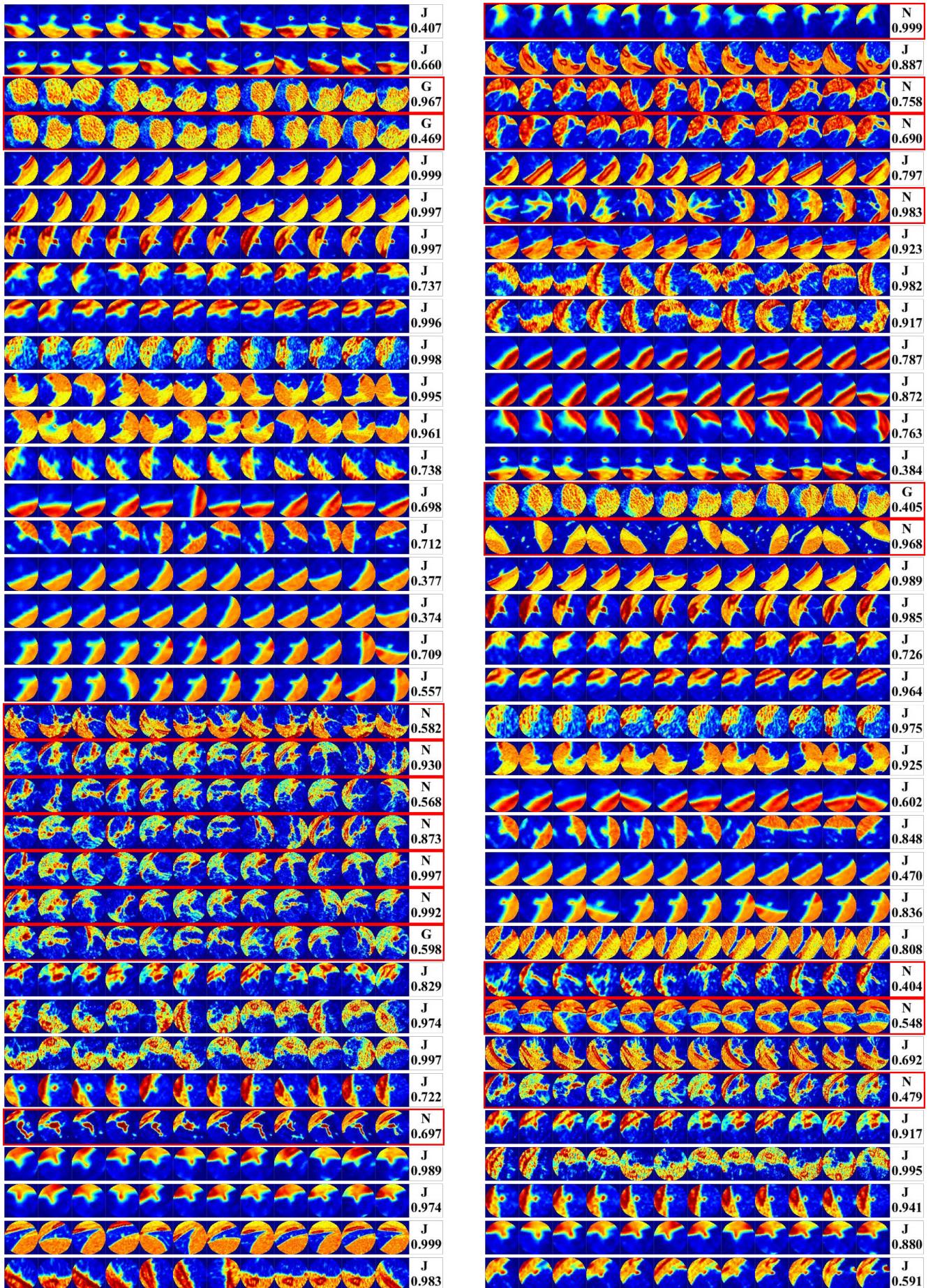


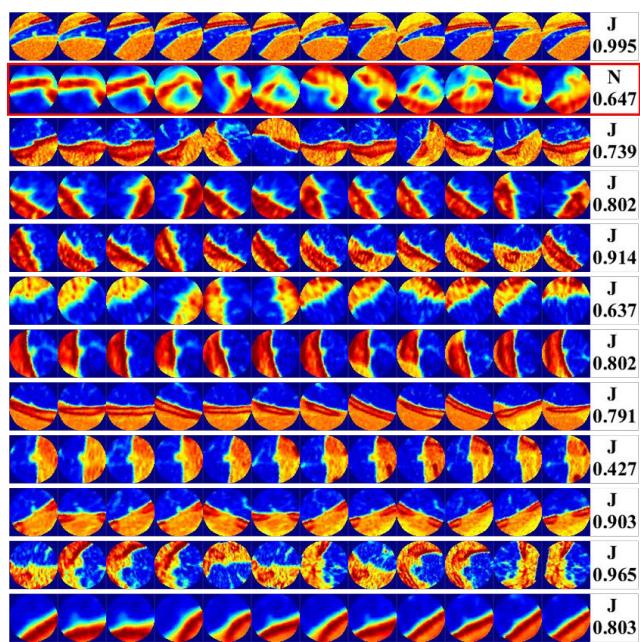


D. GGO for ms-nodulecircles

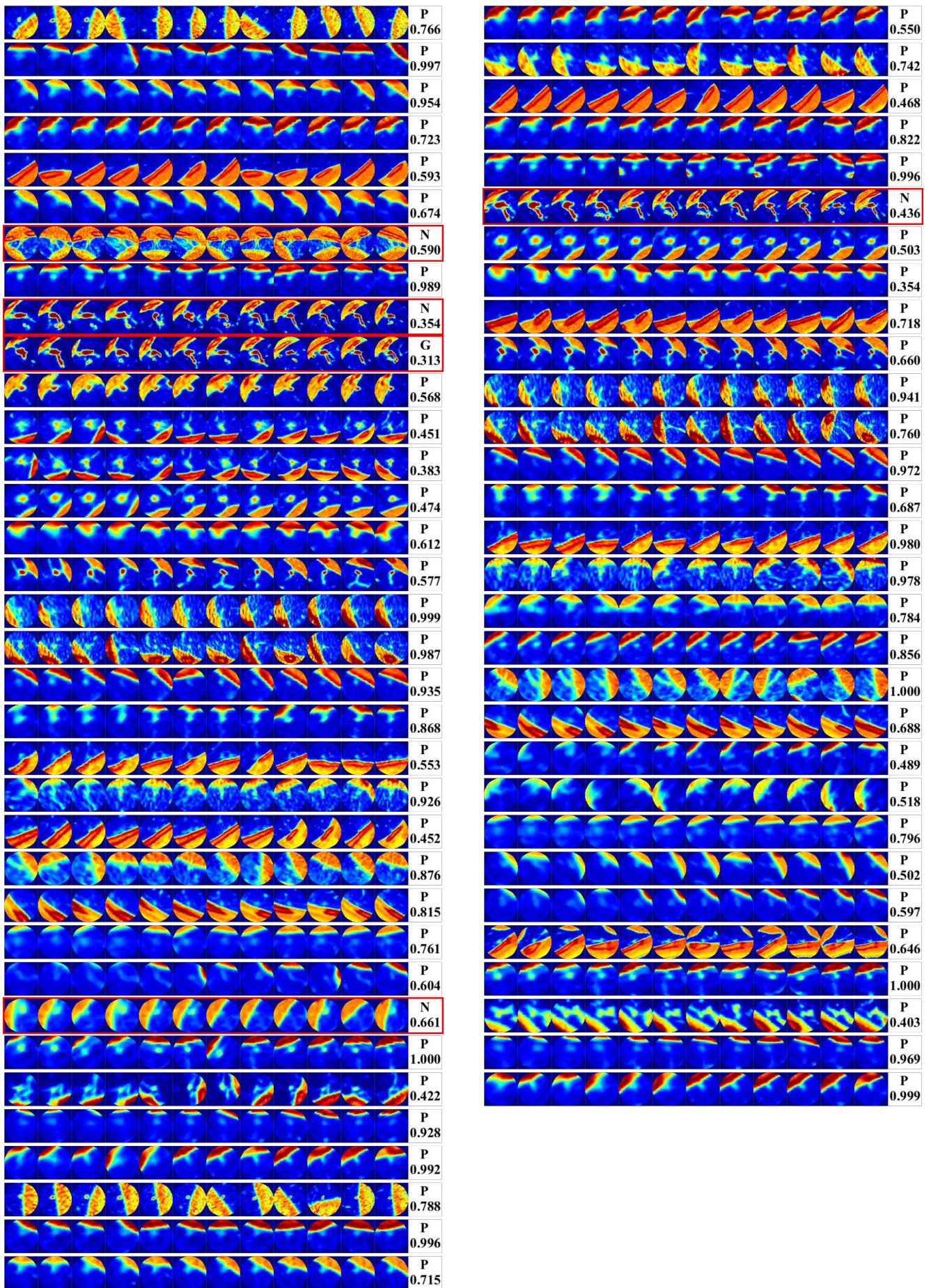


E. Juxta-pleural for ms-nodulecircles

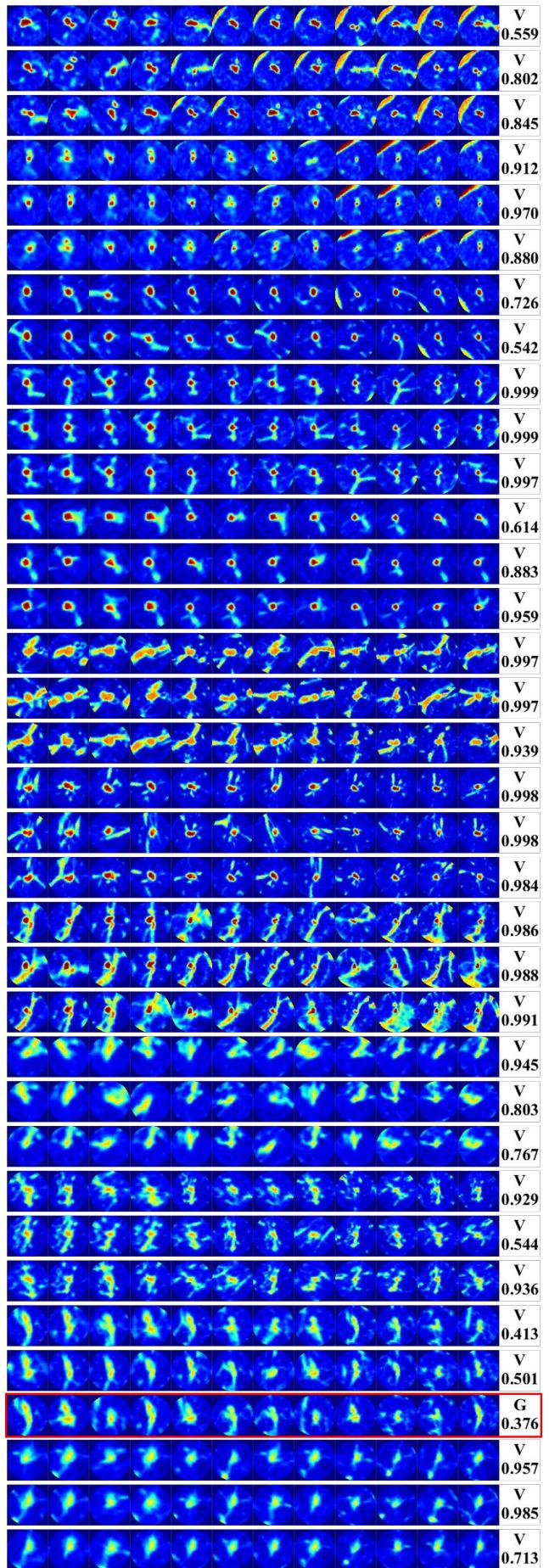
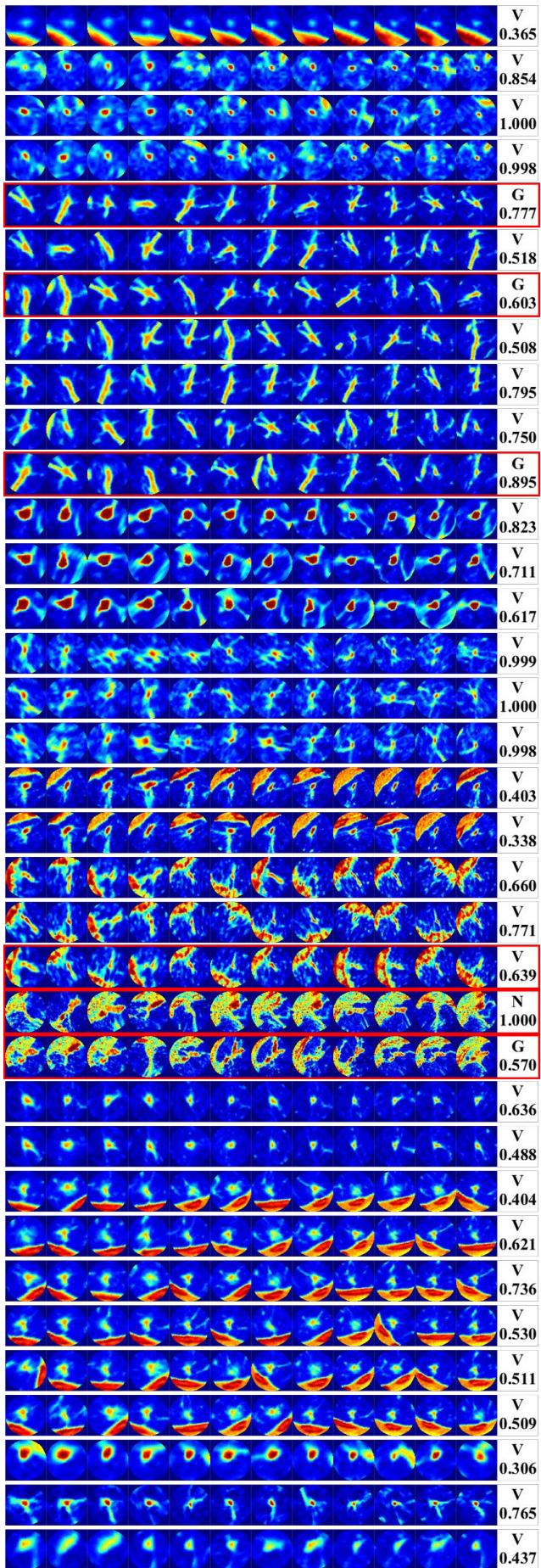


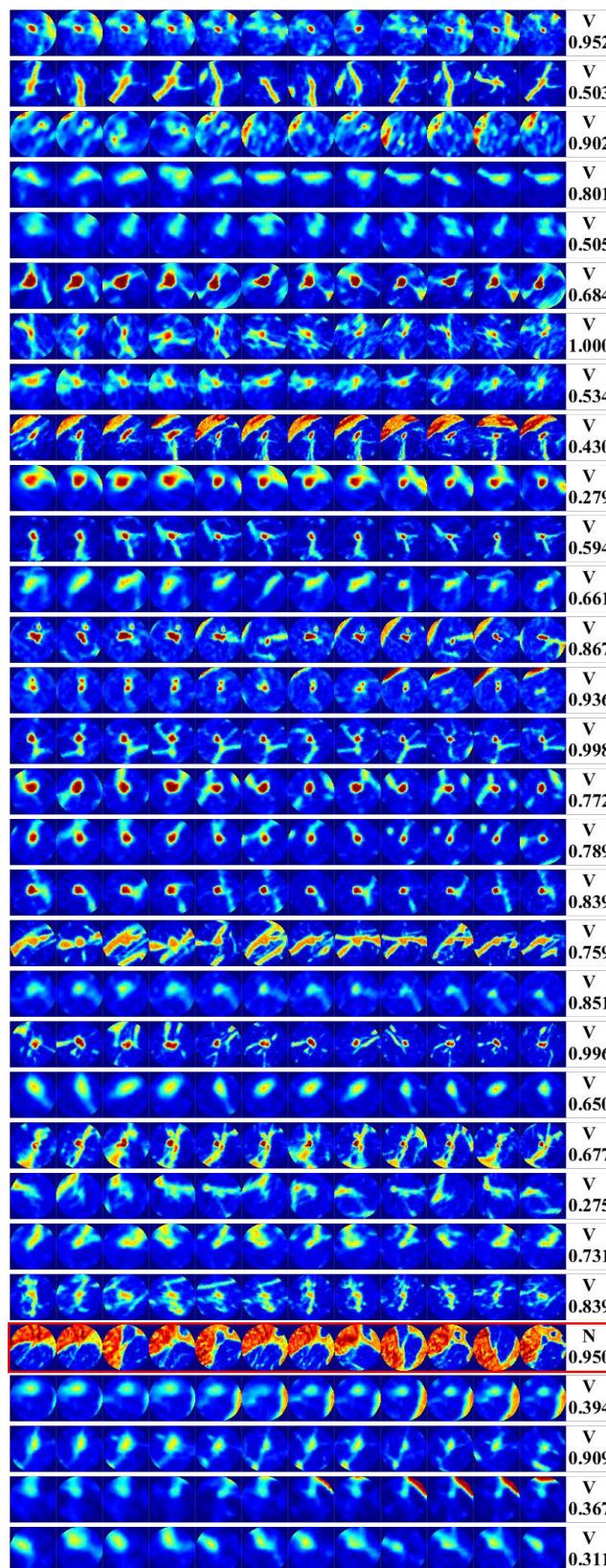


F. Pleural-tail for ms-nodulecircles



*G. Vascularized for ms-nodulecircles*





H. Non-nodule for ms-nodulecircles

